

Radio Communication

August 1989



Last chance to win a DX holiday!

See inside for final clues
and entry form



Ham Radio '89

Impressions of Europe's
biggest exhibition

KENWOOD



Two bands are better than one

The latest handheld transceiver from Kenwood is a real eye-opener, combining as it does the facility to operate dual band FM on 2 meters and 70 centimetres in one small package.

The all new TH-75E is designed to use existing accessories from the popular TH-25E/45E range, and thus completes what must be the favourite hand held transceiver line we have seen.

When you take a serious look at what is being offered to the radio amateur today, it should make you blink in amazement. With the TH-75E, Kenwood have combined into one hand held package the sort of performance and features which would have occupied a decent size suitcase not too many years ago. Not only that, the operating convenience of the TH-75E has to be experienced to be appreciated. You can

keep an eye on both bands at the same time, with automatic band changing according to where the activity is. You can operate simplex or repeater channels with correct offsets and tones. You have duplex operation cross band for "telephone style" conversation. And more.

The TH-75E is a really interesting new transceiver, and we are looking forward to the first volume shipments soon. Keep in touch with your Kenwood approved dealer for the latest news.

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines)

Sole Appointed UK Distributor for KENWOOD Amateur Radio

Editor
Trevor Preece, G3TRP

Deputy Editor
David Bobbett, G4IRQ

News Editor (Acting)
John Nelson GW4FRX

Design
Linda Penny

Draughtsman
Derek Cole

Editorial Secretary
Marcia Brimson

All contributions and correspondence concerning the content of *Radio Communication* should be posted to:

The Editor
Radio Communication
Lambda House, Cranborne Road
Potters Bar, Herts EN6 3JE

Tel (Editorial): 0707 59015
Tel (GB2RS late changes):
0707 59260
E-mail (Telecom Gold):
76:MSX020
Prestel Page 8107

Reports for *Spectrum Analysis* should be sent to the Band Editors:

HF
John Allaway, G3FKM, 10 Knightlow
Road, Birmingham B17 8QB

VHF/UHF
Norman Fitch, G3FPK, 40 Eskdale
Gardens, Purley, Surrey CR2 1EZ
(Telecom Gold 76:MSX022)

Telex: 9312132268 (SAG)
SWL
Bob Treacher, 93 Elibank Road,
Eltham, London SE9 1QJ
MICROWAVES
Mike Dixon, G3PFR, Woodstock,
Gazebank, Norley, Warrington,
Cheshire WA6 8LL

ADVERTISING

All display and classified advertising enquiries (excepting Members' Ads) should be directed to our advertisement agents:

Victor Brand Associates Ltd.,
'West Barn', Low Common,
Bunwell,
Norwich, Norfolk NR16 1SY.
Tel: 095 389 8473
Fax: 095 389 8437

Radio Communication is published by the Radio Society of Great Britain as its official journal on the last Friday of the previous month and is sent free and post paid to all members of the Society.

Closing date for contributions, unless otherwise notified, is five weeks prior to publication date

© Radio Society of Great Britain
1989

ISSN 0033-7803

Filmset by JJ Typographics Ltd,
Cottis House, Locks Hill, Rochford,
Essex. SS4 1BX

Printed by Mayhew McCrimmon
Printers Ltd, Units 1-4 Star Lane
Industrial Estate, Great Wakering,
Essex. SS3 0PJ.



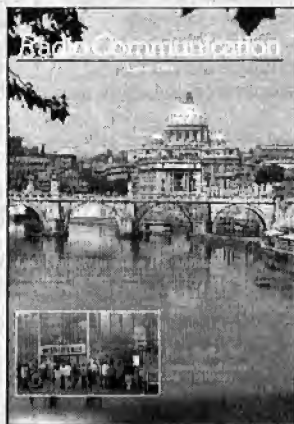
36,070 copies per
issue average
circulation in 1987

Radio Communication

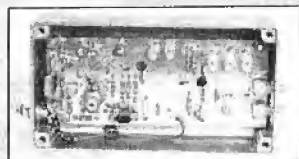
VOLUME 65 No 8

AUGUST 1989

CONTENTS



Main Photo: The final clue for the RadCom DX Competition, (p44)
Photo Courtesy of The Photographers Library. Inset: View of the retailers hall entrance at ham-radio '89, (p14).



A home built Microwave Committee PCB shown installed in a die-cast case (p39).



The early days of 10m trans-Atlantic experiments (p52).

- 4 **SOCIETY AFFAIRS**
Junk Mail, HF Committee News, RAYNET Elections
- 7 **NEWS**
18 and 24MHz Gazette Notice, UK Novice Licence, VHF Convention '89, Don Wallace Museum, Turkey and CEPT, New Products, Rule 16 Again, RAE Courses, Phonetic Alphabet, 'ham-radio 89'
- 16 **THE GAMBIA — A DXPEDITIONISTS TALE**
This is what DXpeditioning is really like!
- 19 **SPECTRUM ANALYSIS**
 - HF
 - HF Propagation Predictions
 - VHF/UHF
 - SWL
- 34 **TECHNICAL TOPICS**
Handling Chemicals ● Tuning the I1ARZ Loop ● Broadband Transmitter Noise ● Gray-Line Globes ● Aircraft Enhanced Propagation ● Converters and Components ● New Antenna?
- 39 **MAKING MICROWAVES WORK**
A painless 'building-block' approach to microwave construction
- 41 **A LOW-PASS FILTER FOR HIGH POWER**
A simple home-brew solution for QRO operators
- 44 **DX COMPETITION — FINAL CLUES**
It's time to get the atlas and pocket calculator out for the last part of the RadCom/Serenity Holidays competition
- 45 **DX COMPETITION ENTRY FORM**
- 46 **RSGB MAIL ORDER PUBLICATIONS**
- 48 **SPORADICE E — PART 4**
Jim Bacon concludes his fascinating series by summing up the evidence and providing a handy check-list for Es watchers
- 52 **CROSSING THE POND ON TEN**
The current sunspot maximum may be new to some but the story really starts in 1928
- 54 **THE EXTRA ZIP**
An easy to build alternative to stacked HB9CVs
- 63 **COLUMNS**
 - DATACOMMS Mailbox Licences, Groups News, WORLI Software Report
 - SATELLITES 2m intruder, Oscar and RS News, Birmingham Information Net
 - MICROWAVES Novice Licence, Round Tables, Newsletter
 - SWL Award Activity, ILA News, Contests, Taking Gear Abroad, More on Antennas
 - EMC MATTERS 1992, Automotive Industry, Pacemakers, Phones, EMC Helpline
- 71 **CONTEST NEWS AND RESULTS**
- 74 **CONTESTS CALENDAR**
- 79 **MEMBERS' ADS**
- 82 **HELPLINES**
- 83 **DIARIES AND DATES**
Mobile Rallies, GB Calls and Club Diary
- 86 **THE LAST WORD**

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913. Incorporated 1926. Limited by guarantee.
Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the secretary, from whom full details of Society services may also be obtained.

Headquarters and registered office:
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Telex 9312 130923 (RSGB)
Electronic mail via Dialcom/Telecom Gold: 87:CQQ083
Telephone: 0707 59015. Fax: 0707 45105

Secretary and Chief Executive: David Evans, G3OUF

COUNCIL OF THE SOCIETY

PRESIDENT: J Gannaway, G3YGF
EXECUTIVE VICE-PRESIDENT: F D Hall, GM8BZX
IMMEDIATE PAST-PRESIDENT:
Sir Richard Davies, KCVO, CBE, CEng, FIEE, G2XM
HONORARY TREASURER: POSITION VACANT

ORDINARY MEMBERS OF COUNCIL

E J Allaway, MB, ChB, MRCS, LRCP, G3FKM
N G Brinkworth, G3UFB
Mrs M H Clayton-Smith, G4JKS
G R Jessop, CEng, MIEE, G6JP
A McKenzie, MBE, CEng, FIEE, FAES, G3OSS
F S G Rose, G2DRT
G L Benbow, Msc, CEng, MIEE, G3HB

ZONAL MEMBERS OF COUNCIL

Zone A G R Smith, BSc, MISC, MBIM, G4AJJ
Zone B J Allen, G3DOT
Zone C J Greenwell, AMIEE, G3AEZ
Zone D P E Chadwick, G3RZP
Zone E E J Case, GW4HWR
Zone F J T Barnes, G13USS
Zone G F Hall, GM8BZX

HONORARY OFFICERS

Audio Visual Library co-ordinator: R G Auckland, G2PA
Awards managers: HF: S Emlyn-Jones, GW4BKG;
VHF: Ian L Cornes, G4OUT
Chief morse test examiner: A N Ianson, G3GDO
HF manager: E J Allaway, G3FKM
Microwave manager: C W Suckling, G3WDG
Trophies manager: Mrs M H Clayton-Smith, G4JKS
VHF manager: K A M Fisher, G3WSN

Correspondence to honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

ANNUAL SUBSCRIPTION RATES

Once-off joining fee: £1.50

Corporate members: UK and overseas (Radio Communication by accelerated surface post): £20.50

UK associate member under 18: £6.95. Family member: £8.20

UK students over 18 and under 25: £10.45 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £20.50 (including Radio Communication)
£12.30 (excluding Radio Communication) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

Contests committee HF news

The committee chairman would like to thank those members who offered their services to fill the two vacancies that were advertised on GB2RS and in Radio Communication. From the applications, Peter Hobbs, G3LET and John Wayman, G4DRS were selected and have joined the committee as Full Members.

The committee are always pleased to hear from members on

any matter related to the Society's HF contests. In this context, a number of members have asked the committee to review the decisions to withdraw the February 7MHz SSB contest and the March Town and County 1.8MHz SSB events from the calendar. The HFCC are pleased to announce that two new events are being arranged on an experimental basis. The first is a new Low-Frequency SSB event to replace the 7MHz 'phone contest and this will take place in February 1990. The second, is a

NEWS EDITOR

The Radio Society of Great Britain requires a News Editor for its monthly magazine "Radio Communication" and weekly on-air news broadcasts. Familiarity with the technical hobby of Amateur Radio, plus the ability to recognise a good story, follow up leads and write to fit are necessary qualifications. Some experience of working with modern 'electronic' production and office communications equipment would also be highly desirable; the RSGB's publications are moving rapidly towards desk-top publishing.

It is a staff position within a small, enthusiastic new team, operating from offices in Potters Bar. Salary is negotiable, according to experience and age.

Please apply in writing, enclosing a CV, to the Editor, Radio Communication, Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE. Please mark the envelope "Editorial Vacancy Private and Confidential."

COMPUTER PROGRAMMER

The Radio Society of Great Britain has a vacancy for a full-time computer programmer, based at its headquarters in Potters Bar.

The successful candidate will need to have had sound experience of RPG III and should have knowledge of the IBM38 or similar systems. An ability to manage the headquarters 20+ terminals will be required and knowledge of PC systems would be considered to be an advantage.

A very satisfactory remunerative package will be available to the right person for this demanding appointment.

Applications, including a CV, should be sent to:

**Mr R Seaman, Accountant,
Radio Society of Great Britain,
Lambda House, Cranborne Road,
Potters Bar, Herts EN6 3JE.**

Help wanted with QSL Pile-up

In recent months more QSL cards than ever have reached the QSL Bureau from overseas national societies as a result of increasing band activity. As a result, although our two bureau staff are sorting these cards as fast as they can, they are nevertheless overloaded by the sheer volume at present. Thus we need more help.

To combat this QSL overload problem we have set up a special sorting room at HQ and we are

asking for volunteers to come and help with the back-log. If you are able to help, please let us know immediately by post, writing 'QSL/DS' on the front of your envelope and enclosing details of a day-time telephone number where you may be reached.

The RSGB and its members would greatly appreciate any help which is offered in getting our QSL mountain down to manageable proportions.

new 1.8MHz SSB event which is scheduled for March 1990. Details of both events will be published in the 'Contest News' section of Radio Communication shortly.

There has been a suggestion that the start time for the ROPOCO contests should be brought forward by one hour (from 0800GMT to 0700GMT). This is to obtain better inter-UK propagation and cause less interference to non-contest members. The HFCC chairman, Ron Glaisher, G6LX, would welcome comments from members who have an interest in these events.

Raynet Zone 2 Election

A call for nominations for Raynet Zone 2, comprising Humberside, North, South and West Yorkshire, was recently made. Two valid nominations were received by the closing date;

Mr W F Marshall, G4IOD

Nominated by:

Mr K Boothroyd G1FYS,

Mrs B Grayson G4OTE,

Mr G Grayson G3YWI,

Mr L R Bower G4HKY,

Mrs J R Marshall G4KFP.

Mrs P M Smith, G4ZWQ

Nominated by:

Mr D Critchlow G3PTV,

Mr G W Laycock G3WZW,

Mr R D Gilling G0AHV,

Mr D Williams G6ONE,

Mr B Wilson G6HWI.

Any current Raynet member registered in the zone may record his or her vote for one of the above candidates in the following manner. No special ballot paper is required. The text of your vote should clearly indicate which candidate you prefer. Please do not include any correspondence in the same envelope. On the back of the envelope, which must be sealed, you must write in block capitals, your name and call-sign. The

envelope must be addressed to "The Secretary (Raynet Zone 2 Election)" at RSGB Headquarters. Your vote must reach HQ by 5.15 pm on Friday 1st September 1989.

The result of the election will be announced on GB2RS, the Raynet Sunday net and also in *RadCom*.

Raynet Zone 4 — Vacancy

Due to the resignation of Derek Gardiner, G4UJQ, as a result of ill health there is now a vacancy for a representative in Raynet Zone 4. This zone is comprised of the counties of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk.

Raynet members resident in this zone may forward nominations for their zonal representative to "The Secretary (Raynet)" at RSGB Headquarters. Nominations should be supported by five Raynet members who are currently registered within the zone, and they must be received no later than 5.15 on Friday 29th September 1989. They should be accompanied by a declaration from the nominee that he or she is, a) normally resident within the zone. b) is a currently registered Raynet member. c) is a member of RSGB and d) is willing to serve if elected.

Intending nominees are strongly advised to read the guidance notes on the role and the duties of a Zonal Representative before submitting their application. These notes have been prepared by the Raynet Committee and are available either from the Chairman, G3YAC QTHR or from Membership Services at RSGB HQ.

The period of appointment is normally three years. When more than one valid nomination is received by the due date, an election will be held during the month of December.

FROM THE SECRETARY

Junk Mail?

From time to time we all receive what we colloquially term 'junk mail' through our letter boxes. Such mail is unsolicited and from companies who have obtained our names and addresses from somewhere and want to sell us something. No doubt some members bin the envelope and its contents while at the other extreme no doubt some members read all of the literature sent to them line by line. In other words, we all react differently to such practices and no doubt on occasions some members actually buy some product or service as a result.

In connection with the RSGB affinity credit card scheme, some members have written asking why the Society had given the RSGB membership list to another company so as to produce a mailshot. That impression needs correcting. It was the RSGB Council who agreed to the credit card scheme and, as stated in *RadCom*, wanted all members to have direct information made available so that they could judge the value of the product being offered for themselves. The mailing shot which resulted was at the request of the Society and on its behalf. Mailing information was thus provided to the Bank by the Society for the specific purpose of this one mailing. It is important to note that in fact the mailing was performed on the behalf of the Society and at no cost whatever. The Bank only acted, so far as the mailing shot was concerned, as an agent for the RSGB in a similar manner to the company which mails *RadCom* to you on our behalf each month.

Another batch of letters, some thirty in all, complained to the Society that they did not like mailshots and did not wish to receive them. Again, there are a number of aspects to this which need to be explained.

The Society exists to serve amateur radio and RSGB members by means of a Council which is democratically elected by the membership to direct the actions of the organisation. When the Society achieves a surplus of income over expenditure in a given financial year, the money is basically there to be put back into amateur radio since the RSGB has no shareholders. No company, the RSGB included, can achieve any of its objectives without money and so at the present time the Society's Council is looking favourably at any reasonable scheme which will help to boost RSGB funds. At the end of the day, any income which is generated by Council drawing members' attention to products and services, either helps to offset future increases in membership dues or helps to achieve better services - a better *RadCom* for example. In fact the credit card scheme provided a donation of £5 to the RSGB for every member who joined.

Since Council recognises the financial advantages of gaining income by drawing the attention of members to products and services, it is intended to continue to send such information to members. This will either accompany *RadCom* or be distributed separately by post. However, it is recognised that some members do not wish to receive direct mailing shots under any circumstances. Thus, in order to accommodate their wishes, a special provision will be made; please write to 'Mailshot/CU' if you do not wish to receive direct mailshots. However, please bear in mind that any income derived by the Society simply helps to either lower costs for the membership as a whole or improve services to members.

David Evans, G3OUF

Another new publication from RSGB

NEW !

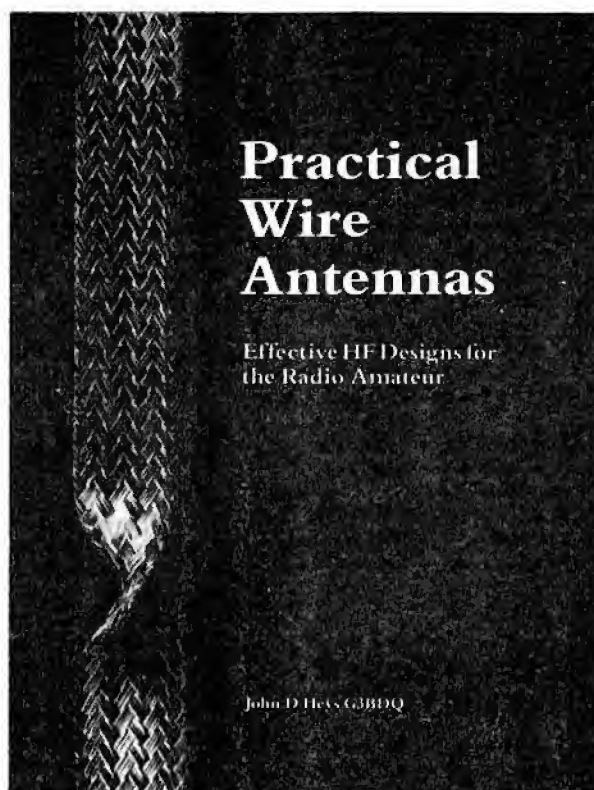
Practical Wire Antennas

by John D. Heys G3BDQ

Wire antennas offer one of the most cost-effective ways to put out a good signal on the HF bands, and this practical guide to their construction has something to interest every amateur on a budget.

Many different types are covered, ranging from simple dipoles to ingenious multi-wire systems - even underground antennas! Full details of feeding and matching are included, making each antenna easy to set up and use successfully.

Theory has been kept to a minimum - instead, the author has shared his years of experience in this field, offering 'down-to-earth' advice that will be appreciated by beginners and enthusiasts alike.



No-one who builds and uses wire antennas can afford to be without this handy guide.

Available NOW !

ORDER NOW ! £6.88 to RSGB members by post

"Amateur Radio Use Restrictions Lifted"

NEWS & REPORTS

So saith a press release from Waterloo Bridge House, as usual written in the usual PR not-quite-English beloved of the likes of HRH the Prince of Wales – no wonder they say that PR men are failed journalists... It basically outlines what ought to be clear from the Gazette Notice which we'll hopefully have published elsewhere in this issue of RadCom. It goes on:

"The World Administrative Radio Conference 1979 agreed that the 18.068-18.168 and 24.89-24.99MHz

Wales murder inquiry

Peter Dixon, G0HFQ, and his wife Gwenda were tragically murdered on 29 June whilst on a camping holiday in South West Wales. We expect to have further information concerning this matter next month.

bands should be transferred to the amateur service on a primary basis. In order to protect existing users, while replacement frequencies were being found, these bands were made available to Class A amateurs on a restricted basis, with limitations on type of transmission, maximum power and antenna characteristics, subject to causing no interference to other services. "Arrangements have now been completed for the transfer of these other services. As from July 1, Class A radio amateurs may use these bands with all their permitted types of transmission (Morse, Telephony, Radio Teletype, Data, Facsimile and Slow Scan Television) subject only to the usual maximum power limitations applying to the amateur high frequency bands (20 dBW Carrier or 26 dBW PEP)."

DEPARTMENT OF TRADE AND INDUSTRY					
WIRELESS TELEGRAPHY ACT 1949					
Notice of Variation					
The Secretary of State gives notice pursuant to sub-section (4) of the Wireless Telegraphy Act 1949 in all those who are licensed under the Amateur Radio Licence (A) or (B) which have been issued and remain in force that from 1st July 1989, the Schedule of each such licence for frequencies below 30 MHz shall be varied as follows:					
1	2	3	4	5	6
Frequency bands in MHz	Status of allocations in the United Kingdom to The Amateur Service	The Amateur Satellite Service	Maximum Power Carrier	PEP	Permitted types of transmission
1.810-2.000	Available on the basis of non-interference to other services (inside or outside the United Kingdom)	(Not allocated)	9dBW	15dBW	
3.500-3.800	Primary Shared with other services				
7.000-7.100	Primary	Primary			
10.100-10.150	Secondary	(Not allocated)			
14.000-14.250					
14.250-14.350					
18.068-18.168					
21.000-21.450	Primary	Primary	26dBW	26dBW	Morse, Telephony, RTTY, Data, Facsimile, SSTV
24.890-24.990					
28.000-29.700					

At J. Mitchell, on behalf of the Secretary of State for Trade and Industry, 12th June 1989 (12/89)

NEWS FROM WATERLOO BRIDGE HOUSE – RESIDENCY CONDITIONS CLARIFIED

In a recent letter from WBH, the matter of what constituted 'residency' for reciprocal licence purposes was clarified. The DTI said that they had finally settled on a definition for residency; the letter continued:

"This now means that, provided a reciprocal agreement exists between the UK and the country concerned, the following types of licences are available to visiting radio amateurs:

(a) up to two months – where the applicant cannot supply a UK contact address for the duration of the visit (for example, when he or she is visiting the UK on a motoring holiday).

(b) any period up to one year – where a contact address in the UK has been supplied with the application.

(c) a full UK licence to anyone staying in this country for more than one year. In this case, the applicants' details would be put on the computer and he/she would be allocated a full UK callsign. "Neither (a) nor (b) above are renewable and in both cases applicants should use their home call signs with the appropriate UK identifier.

"Applications for (a) and (b) should be made on the temporary licence form (currently being updated) and those for type (c) on the normal UK licence application form (also being updated).

"In a letter dated 2 June, the DTI approved a large batch of repeaters and mailboxes, as follows:

GB7ERA – 70MHz packet mailbox
GB7MAC – 29MHz packet mailbox
GB7MAC – 430MHz packet mailbox
GB7KB – 70MHz packet repeater
GB7KB – 430MHz packet repeater
GB7KB – 1.3GHz packet repeater
GB7PL – 430MHz packet repeater
GB7PL – 1.3GHz packet repeater
GB7PL – 70MHz packet repeater
GB7EY – 430MHz packet repeater
GB7FC – 430MHz packet repeater
GB7MH – 430MHz packet repeater
GB7JSC – 430MHz packet mailbox
GB7OCN – 430MHz packet mailbox
GB3HY – 430MHz speech repeater
GB7WP – 430MHz packet repeater

GB3MK – 430MHz speech repeater
GB7CHS – 430MHz packet mailbox
GB7HHD – 430MHz packet mailbox
GB7NWP – 430MHz packet mailbox
GB7UWS – 430MHz packet mailbox
GB7WA – 430MHz packet repeater
GB7ZPU – 430MHz packet mailbox
GB7BST – 430MHz packet mailbox
GB7CDM – 430MHz packet mailbox
GB7ESX – 430MHz packet mailbox
GB7HHH – 430MHz packet mailbox
GB7HDS – 430MHz packet mailbox
GB7SPV – 430MHz packet mailbox
GB7IMB – 430MHz packet mailbox

STOP PRESS - UK Novice Licence

As part of the RSGB Project YEAR initiative, the Society has developed a comprehensive Novice Licence discussion document. This was formally presented to Robert Atkins MP, Parliamentary Under-Secretary of State for Industry, by the Society's Immediate Past President, Sir Richard Davies at the DTI in Westminster on 20 July 1989.

Members may obtain a copy of the Novice Licence discussion document by writing to: David Simmonds, G3JKB, at RSGB Headquarters. Please enclose a payment of £3 to cover postage and packing costs.

South Hams Gateway to packet

We had an interesting letter from the 'South Hams Packet Group' the other day. This group was formed some months ago with the intention of setting-up a set of remote network nodes to cover part of South Devon; it now has 23 members. The original group of six financed the building of SDN2 on 144MHz and their book *Your Gateway to a Better Understanding of AX25 Packet Radio* drummed up the cash for the building of a second network node for the remote area around Kingsbridge. The book looks a jolly good read; there are 34 A4 pages covering all aspects of how to get started on packet as well as some of the more complicated bits. You can get a copy from Vince Bobin, 13 Homelands Place, Kingsbridge, Devon TQ7 1QU, and all proceeds go towards the running and establishment of their network nodes. It costs a mere £3.50 plus 50p post & packing, and they'll give a discount if 10 or more copies are ordered. Ring Vince on 0548 2543 for more info.

For VHF enthusiasts the RSGB National VHF Convention is probably the social highlight of the year; it attracts visitors from the length and breadth of the British Isles, and from a number of overseas countries as well, all keen to look round the trade show (well, elbow round, perhaps) and sample the excellent lecture programme. Once again the venue was the Sandown Park Racecourse at Esher in Surrey, an excellent and easily accessible site with acres of car parking. This year it was held on 16 April, immediately following the Toy Fair. By co-operating with the latter's organisers, the Society was able to effect considerable savings in cost.

The talk-in station, GB2VHF, was kept very busy all morning on S22 and SU22, giving directions to those travelling to Esher for the first time. Two pairs of turnstiles were in operation and we got in twice as quickly than last year, so within an hour of opening the queue had dwindled to nothing. Steve White, G3ZVW, must have worn out his shoes patrolling the queue asking people to use both sets of turnstiles. By 2pm a total of 3362 people had been clocked in and the final total was estimated to have been in excess of 3500.

As always, the trade show was very comprehensive. Items on offer ranged from LEDs for a few pennies to the latest, feature-packed multimodes costing the proverbial arm and a leg. There was an abundance of test gear on display. It might not have been quite state-of-the-art, but if you had room for it and didn't mind risking a hernia carrying it out, there were some fine bargains to be had. It's well worth rummaging around on the floor under the traders' tables to discover the real gems; oh, and another good tip is to go round the traders more than once, since they tend to replenish the tasty stuff which gets sold with more tasty stuff from the van outside! Bargain of the day had to be a brand-new Greenpar RF adaptor kit; these are currently about £40 new but the trader had five brand-new ones for £5. Mind you, he didn't have them for long...

Given that there was more space available this year, a flea market was shoehorned in so that visitors could sell their unwanted gear. The Society's specialist groups, such as the Microwave, Propagation Studies and VHF Committee, were to be found upstairs instead of cluttered around the RSGB Bookstall area on the ground floor - that was a definite improvement over the jam-packed situation of the last fifteen

RSGB NATIONAL VHF CONVENTION 1989



Hillbillies Contest Group — One of the most successful in last years contests.

years or so! The special interest groups were well represented, bringing home just how very diverse the hobby has become in recent years. The ubiquitous home computer has contributed significantly to this diversity, particularly in the broad field of data communications. Consequently the stands of AMSAT-UK, BARTG and the Remote Imaging Group featured several colour monitors doing clever things - a far cry from the old days when the Convention was held at the Winning Post Hotel.

The Convention address was given by the President, Dr Julian Gannaway, G3YGF, who said that his interests extend from Top Band to the microwaves. He spoke of the rapid developments in the hobby, which are placing a heavy load on the Society. Julian gave an account of recent international meetings at which the impact of forthcoming EC legislation, likely to affect amateur radio, was discussed. (This was fully reported on page 9 of June's *RadCom*).

The President stressed the need for all radio amateurs to join and support their national society and said, "I want to encourage everyone to consider whether there is any area where they can help the Society and the hobby. After all, the hobby is only what we make of it." He said that he was pleased to see the rapid growth of 50MHz activity in Europe. After that came the presentation of the Society's VHF/UHF trophies - see the photographs in July *RadCom*.

As always, the lectures proved

quite popular - as verified by the sudden thinning-out of the crowd in the trade show! EMC is a topic much in our minds with the harmonising of EC legislation by 1992, and Neil Brinkworth, G3UFB, dealt with its implications. Sporadic E is one of the most fascinating phenomena for VHF operators and Dr Geoff Grayer, G3NAQ, had a large and attentive audience for his talk. A good proportion stayed for the VHF Committee Forum; this started with an unbilled cabaret act by Ray Cracknell, G2AHU, who demonstrated how to fall off a stage without sustaining injury! Chairman Malcolm Appleby, G3ZNU, then gave a concise account of recent changes to VHF/UHF reporting in

RadCom. A variety of topics were aired during the remainder of the session.

Although listed as "A beginner's guide to VHF operating techniques," Dave Butler, G4ASR, changed the theme of his talk to "A guide to VHF/UHF DX operating," putting the accent on how to become a good DX operator. He dealt with most of the VHF propagation modes but unfortunately left little time for questions from the floor. Owing to military, commercial and amateur satellite and repeater demands on the 430MHz band, it makes sense to consider the microwave bands for TV and Mike Sanders, G8LES, dealt with these matters in some detail. Philip Howarth, G3YAC, spoke about Eastnet and microwave packet links only attracted a couple of dozen people - most of them dedicated packeteers with very few true beginners.

The four-year-old Remote Imaging Group's "lecture" was its AGM. The 1000 or so members, not all of whom are radio amateurs, are interested in receiving pictures from the international weather satellites. Group chairman Henry Neale, G3REH, spoke of a successful year with rising membership. The retiring committee was re-elected en bloc and the meeting closed with a wide-ranging question-and-answer session.

The Morse Test Forum was chaired by Fred Stewart, G0CSF, one of several examiners from the South London and Surrey group. He introduced Robert McEwan Reid, G4GTO, who explained how examiners determine the 12 words per minute speed for the Morse test and the method of conducting it. There was a long discussion on the best ways of teaching the code, with a suggestion that sending ought to be mastered before attempting receiving. The audience included candidates who had taken the RSGB test during the morning!

Geoff Stone, G3FZL, was the overall organiser and Les Hawkyard, G5HD, dealt with the trade show. As usual, many volunteers helped with 'table humping' but even so, some VHF Committee members and friends were still working hard, clearing up, at 2000 hours. We owe our hearty thanks to all who helped make this event such a success.

ATV on Mont Blanc

We hear that an amateur television expedition is going to the top of Mont Blanc between 16 and 23 August 1989.

Apparently a group of French and Belgian amateurs signing TV7SMD will install an ATV transponder on top of the 'Aiguille du Midi' 3800m ASL: this will receive TV signals from climbers equipped with cameras and pocket 1.2GHz transmitters and retransmit them on 438.5MHz, positive modulation, with 100W to 4 x 21-eles. So if there's any propagation that way at that time, point your antennas at Mont Blanc and see what you can see. They're also on 144.17 MHz.

Don Wallace Museum

Within a few months, a new tourist attraction will be opening in Southern California. The 'Don C Wallace Rhombic & Historical Museum' located near Palmdale, some 40 miles north of Los Angeles, may never rival Disneyland but it's set to become a place of pilgrimage for DX-chasers all round the world.

Who was Don Wallace? Probably the most successful all-round DXer and contesteer ever, right from the early days of the spark transmitter to the synthesised 1980s. Don thought big, and achieved big; to own something akin to the 'Rhombic Farm' which he developed in later years on top of the peninsula of Palos Verdes became the ultimate dream of many HF DX and contest operators.

First licensed as 6OC in 1913, Don entered the US Navy and served as chief radioman for President Wilson aboard the *George Washington* for the trip to the 1919 Peace Conference at Versailles. His 'modern' rig for that voyage was a 40kW synchronous arc. On leaving the navy, Don moved to Minnesota and was licensed as 9ZT and 9XAX for experiments. The text of the 9XAX licence read "any wavelength, any power, any time" (*must try and get the DTI to write that on mine - Ed*). By 1923 his station was using a 250watt tube (rare at that time) and he had a receiver with an audion in the tuned RF stage. For this he received the Hoover Cup, from the Secretary of Commerce Herbert Hoover, for the "best all-round amateur radio station in operation during 1923, the major portion of which has been designed and constructed by the amateur himself". A year later he made a trans-Atlantic contact with 8AB in France, within a month of the first-ever QSO "across the pond" and

gained one of the first-ever WAC (Worked All Continents) awards.

In 1926 Don moved to California, where his home-brewed station included a 1kW water-cooled final amplifier. He soon gained the WAC award with his new call, 6AM, and in 1927 he won the first-ever DX contest.

The archives of the museum contain files of Don's correspondence with fellow amateurs around the world, and the section for 1928 contains a letter from G2KF reporting Don's signals unexpectedly on 20 metres one Sunday afternoon. G2KF correctly concluded that - since no other USA stations were audible at that time - the signals must have been audible via the long path. He apologised for not calling Don straight away but explained that he has just set his transmitter up for a wavelength of 10.5 metres and it would have taken too long to QSY!

Following the 1929 ITU conference, US stations were assigned the prefix W and Don gained the call by which he was to be known for the rest of his life - W6AM. Moving to Long Beach, his antenna farm grew larger and larger. Fourteen transmitting antennas were strung in various directions, including an eight-element wire beam and a rhombic together with assorted receiving antennas. The largest mast, which was 170' high, was erected with the assistance of a 95' gin pole W6AM was then the loudest station west of the Mississippi, if not in the entire USA!

After World War II Don acquired 120 acres of existing antenna farm from the Press Wireless Company, located on a prime site on top of the Palos Verdes peninsula. He soon had arrays which were to make him the envy of amateurs all over the world; no less than 16 separate rhombics, with more than 60 miles of copper wire, and ten 140' masts. This "Rhombic Farm" gave Don instant (and phenomenal) gain to any part of the world on any band - not for him the usual 'Californian Christmas Tree' of stacked monoband Yagis!

In 1948 Herb Becker, W6QD, then DX Editor of *CQ Magazine*, asked Don how many countries he had worked. Discovering that he had only 70, Don stopped ragchewing and started chasing DX seriously, and by 1956 he was top of the DXCC Honor Roll. He later remarked that this period was the most fun of all his 75 years on the air. Only one country, CR8, escaped him, CW mobile activity was another enthusiasm, and Don's



UK RAYNET gets Award

During its open day on 11 June 1989, the Mid-Lanark Amateur Radio Society presented Raynet with its GM3EHI Award for their work during recent disasters including the Lockerbie tragedy. The photo shows, left to right, Alex Anderson, GM4VIR, of Raynet; Frank Hall, GM8BZX, of the RSGB; Peter Horris, GM3CFK, ex-Chairman of MLARS; and Brian Sargent, GM0JPH, the current MLARS Chairman.

car was equipped with a 1kW amplifier in the boot; three car batteries and an alternator were required to power it.

Don remained active on the bands until his death in 1985 and he was a regular visitor to that Mecca of the DX world, the Visalia Convention. His final tally was something over half a million contacts.

The new museum will house Don's early stations along with one example of his rhombic antennas, the car and its CW kilowatt installation and an archive of newspaper articles and technical books which he wrote over the years. Details of the opening date will be available later.

VHF Field Day site registration

Talking to the Chairman of the VHF Contests Committee, Bryn Llewellyn, G4DEZ, the other day brought up some interesting points about site registration which we thought we ought to pass on. Bryn made some points about what groups do and don't do at registration time; specifically:

1. Forgetting to say whether they're entering the Open or the Restricted section
2. Forgetting to give the locator of their site
3. Forgetting to say which county they're in. Bryn asks that in future,

groups write the county of operation on the top right-hand corner of their application or, better still, use the right form (write to him QTHR with an SASE for a copy). Some groups send in a small section of an Ordnance Survey map with their application but - as Bryn said - "trying to find a little hill outside an unheard-of village takes quite a lot of time; also, I don't have a full set of maps available so there isn't much point in telling me that I'll find it on OS 123 Wessex".

4. One group asks for notification of the arrival of an inspector so that a key can be made available to unlock a gate. Nice try - but the idea of an inspection is that the inspector visits you without your prior knowledge. In future, any group attempting this ploy will be disqualified.

5. On a more serious note, another group mentions that the site has a resident Doberman and that it bites. Inspectors will not be intimidated by such tactics but, here again, if anyone tries this one on next year they'll be disqualified - even if you were only joking...

6. Yet another group claims to be in one country when - according to the Ordnance Survey - they're not. Bryn wonders why his map differs from the hand-drawn one sent in and points out that, although you are allowed to operate within 1km of where you say you are, a change of callsign as well is pushing things a bit!

GM4CHX awarded CBE

Ulster-born James Kyle, who now lives in Aberdeen, was awarded a CBE in the recent honours list for services to health.

James is a well-known surgeon and Fellow of three Royal Colleges and has recently been appointed head of the Grampian Regional Health Board. James also operates as a hobby (groan) - he's licensed as GM4CHX and is often on the VHF and HF bands.

Turkish delight – and more on CEPT

Despite the fact that both the DTI and ourselves thought that Turkey was one of the signatories to T/R 6101 – the multilateral agreement which makes the CEPT licence valid in a given country – it seems that we might have been a bit premature! The DTI has asked the Turkish authorities for confirmation of the position, but for the moment they've asked RALU to remove Turkey from the list of countries printed on the licence validation document. We'll keep you posted and hope they're back soon.

There still seems to be a bit of confusion about CEPT, so here's a bit of clarification (said he, hopefully). Basically, CEPT Recommendation T/R 6101 relates to short-term stays by amateurs in other CEPT countries. It amounts to an agreement which – if a member country of CEPT signs it – allows amateurs from other member countries to operate from their territory for short periods on the strength of their home licence. It shouldn't be confused with a reciprocal licence, which requires a bilateral agreement between two countries and usually leads to loads of paperwork and an amazing amount of administration for Waterloo Bridge House. Out of interest, the current list of member countries of CEPT (which for those who've asked stands for the French for 'European Conference of Postal and Telecommunications Administrations') looks like this: Austria, Belgium, Denmark, Federal Republic of Germany, France, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Spain, Sweden and Switzerland. These countries permit UK radio amateurs who hold a CEPT licence to use amateur radio stations on their territory.

Somebody asked us recently about the CEPT status of Andorra. Andorra is not a member of CEPT, and the DTI has recently established that neither France nor Spain take responsibility for it within CEPT. This means that Andorra isn't a party to T/R 6101. The DTI's understanding is that until recently it was France which issued reciprocal licences to visiting amateurs who wished to operate in Andorra. However, they've now ceased to do so – and the DTI says that they've heard that issue of Andorran licences has been suspended until further notice!



New products

AEA, the manufacturers of the well-known PK232 multimode data controller, have just introduced three new products which will be marketed by ICS Electronics Ltd in the UK. These are the MM-3 memory keyer, the AT-300 antenna tuner and the 'MacRatt' software for the PK-232 and Apple Macintosh. The MM-3 is billed as the "Ultimate Keyer" and has a variety of features including a Morse proficiency trainer with random word generator and a QSO simulator based on AEA's 'Doctor QSO'. Looks extremely nice from the pic and just the job for the editorial shack; we'll keep saving our pocket money until we can afford one and tell you whether it's as good as it looks. The AT-300 also looks rather tasty; it's based on a low-pass filter and features a cross-needle SWR meter

and both balanced and unbalanced outputs. More info from:

ICS Electronics Ltd, Unit V,
Rudford Industrial Estate, Ford,
Arundel, West Sussex BN18 0BD, or
ring them on 0903 731101.

Those clever chaps at C M Howes Communications sent us a large wad of literature the other week; we're not sure what's new and what's been around for a while, but the AT160 dual-band AM/DSB/CW 10W Tx kit for Top Band and 3.5MHz revived memories of the old valve designs of yore and looks very attractive at £34.90 (or £53.90 for an assembled PCB module). They also do a nice active antenna amplifier for 150kHz to 30MHz, the AA2, and a couple of receivers. Bring a little home-brew back into your shack – contact them at:

Eydon, Daventry, Northants NN11
6PT or ring them on 0327 60178.

California DX Foundation

An NCDXF press release dated 22 June announces the retirement of long-term trustee and treasurer Ernie ZumBrunnen, WB6UOM, who has unremittingly and skillfully served the Foundation since 1979. Josephine Clarke, WB6ZUC, has been elected to the Board and Richard Stempien, WA9WYB, is the new treasurer. NCDXF has supported 17 DX operations with cash or equipment grants in the past year. These grants totalled US\$24,631 and assisted the following operations: ZS8MI, 3D2CR, XF4L, VK9ZM (Mellish), VK9ZM (Willis), S9AGD, SUV386, PY0S, TY9SI, T22VU, VK9Y (Cocos Keeling), VK9X (Christmas), 9Q5NW, TN4NW, 9X5AA, and a possible XW operation in the near future.

In the past year NCDXF supplied 317 slide-show or video presentations to 284 groups. This compares with only 137 groups using these services a year ago. This focuses on the need to acquire more such material and any

programmes on DX or DX-related subjects would be much appreciated – please contact WB6ZUC. Finally – the Foundation was pleased to receive a cheque for US\$2,000 from the Rotuma, 3D2XX, operation. This equals the amount granted to it originally – the operators appreciated that the return of the money would help more expeditions to be assisted. If you are interested in the Foundation I suggest writing to PO Box 2368, Stanford, Ca, 94309-2368, USA.

K1BV DX Awards Directory

This contains rules for over 1500 different DX awards from over 100 different countries and also hints on successful certificate-hunting. Data has been recently researched and the 1989 edition is available from Ted Melinorsky, The K1BV DX Awards Directory, 525 Foster Street (Suite R), South Windsor, Ct. Price US \$14.00 or US \$18.00 by air.

Amateur Radio Stars at Discovery '89

Amateur radio will play a major part in linking five international Scout Camps taking place in the United Kingdom from 25 July to 4 August, 1989.

Discovery '89, the name for the event, will bring together nearly 10,000 young people from more than 36 countries. The camps are in Wales, Scotland, Northern Ireland and the north and south of England.

The calls signs to listen out for are:-

- GB2NIS Gosford Forest Park, Northern Ireland
- GB2JDC Marqam Park, South Wales
- GB2SPD Scone Palace, Perth, Scotland
- GB2ESS Broadstone Warren, East Sussex
- GB2RCD Ripley Castle, Yorkshire.

Two other stations will also be operating in connection with the event.

GB2GPD (Gilwell Park Discovery) will be on the air from Chingford, London E4 acting as a communications centre for electronic mail, Prestel and other hi-tech links between the camps.

GB0YAS (Youth Action Scouts) will run for four days from the Youth Action '89 Exhibition at Wembley. This station is being provided and operated by RSGB members from the Scout Association Stand. The exhibition, a major national event aimed at the 14 to 24 year olds, opens on 27 July.

Radio Bygones

The first issue of a new bi-monthly magazine, *Radio Bygones*, will be published on 22 August. Edited and published by Geoff Arnold, erstwhile editor of *Practical Wireless*, the press release said that the magazine would cover "...domestic radio and TV, amateur radio, commercial systems both fixed and mobile, military, aviation and marine communications from the days of Hertz, Maxwell and Marconi to what was state-of-the-art just a few short years ago". The magazine will apparently comprise 32 pages with a full-colour cover and "...will sell by postal subscription and over the counter at selected museums and specialist outlets". More information from the publishers, G C Arnold Partners, 8A Corfe View Road, Corfe Mullen, WIMBORNE, Dorset BH21 3LZ.

THAT RULE 16 AGAIN

No doubt fortified by the volumes of comments made about the infamous 'Rule 16' the Society's VHF Contest Committee has been having another think about it. The Chairman, Bryn Llewellyn, G4DEZ, has now issued a statement:

"There has been a great deal of controversy and concern about the new variation on Rule 16 since its inception. The basic idea was to prevent cheating during contests - no more and no less than that. However, I was not happy about the RSGB, in the guise of the VHF Contest Committee, applying limitations on various types of equipment that could be used by amateurs - in this instance decided by final output device dissipation limits.

"Where normal contests are concerned (not low-power), I feel that the licence conditions currently laid down by the DTI apply. I am not concerned about what type of output device is used so long as (a) the signal produced is clean and (b) does not exceed DTI licence limits.

"With regard to low-power

contests and the restricted section of VHF Field Day, the use of any final amplifying device(s) capable of delivering more than twice the stipulated power limit for that contest will lead to disqualification.

"In the case of Open contests, the proposed use of any amplifying device(s) capable of generating more than 1kW output must be registered beforehand with the adjudicator of that contest. Notification must arrive at least seven days before the contest, together with details of how the power output is to be reduced to the legal limit. The modification must be of a semi-permanent nature, ie, not merely a switch, variable control or variation in drive level. The use of variable transformers (Variacs) in this connection is not allowed. "In the case of low-power contests or the Restricted section of VHF Field Day, the proposed use of any amplifying device(s) not complying with the rules as outlined above and capable of more than twice the output power limit applicable to the

contest must also be registered, together with details of how it is proposed to modify the equipment.

"Any station using equipment which is capable of exceeding the defined limits and which is not registered in accordance with the requirements outlined above will be automatically disqualified. Any station which is inspected and found to be running excessive power, having registered equipment and then re-adjusted it to generate higher power than that at which it has been registered, will be immediately disqualified and will not be allowed to enter any contest organised by the RSGB VHF Contest Committee for a period of one year for the first instance and permanently for a subsequent instance. In this connection, 'station' means 'all operators of that station'.

"All I am asking for is that all groups abide by the terms and conditions of their licences and also by the contest power limits".

The Committee also now has available an information sheet dealing with county/country multiplier contests and how to score them. Bryn says that "...it's become obvious over recent contests that hardly anyone fully understands the requirements for marking the logs or how to provide a suitable Multiplier Check List in accordance with the published rules". Briefly, the contest exchange must include the full county name or country code letters in addition to the normal RS(T), serial and locator. To avoid ambiguity, it's advisable to use the full county name in phone exchanges and leave the code letters for the CW brigade - for whom they were intended in the first place. Bryn commented that "...it's surprising how many points are lost when entrants try to convert from one to the other. It's also much quicker to say Berkshire than Bravo Romeo Kilo, or even just Brk!".

On multipliers, the first valid contact in each country or county can count as a multiplier - but it's *ESSENTIAL* that each claimed multiplier is clearly marked as such in the log (try highlighter or a particularly lurid marking pen). Warning - if you don't mark the multipliers up in your log, you won't get any credit for 'em... Three points to bear in mind:

a) if you work a station in your own county or country, this can be counted as a valid multiplier

b) the first contact with a station in another area with a G prefix (ie, the first GM or GW, etc) can count both as a county and country multiplier

RAFARS QSL bureau

A couple of months ago we gave the name and address of the new QSL Bureau manager for the Royal Air Force Amateur Radio Society - it's Ian Wicker, G0HAV, 73 Queens Road, Fakenham, Norfolk NR21 8BU. However, we also said that

cards couldn't be accepted from non-RAFARS members, which wasn't strictly accurate - well, OK, it was totally wrong! In fact, all cards destined for RAFARS members can be sent to Ian from all sources, whether they're RAFARS or not. However, envelopes can be accepted only from RAFARS members, or RAFARS special-event station licence-holders.



Nevada Nirvana

When he's not working all the 50MHz DX, Mike Devereux, G3SED, is managing director of the well-known amateur and scanner emporium 'Nevada' down in darkest Portsmouth. Mike tells us that they've now got new showrooms with an additional 3600 square feet available - sounds very posh, although we haven't been to see for ourselves yet. Nevada are at 189 London Road, North End, Portsmouth and on 0705 660036.

AWARDS

NATIONAL

Key Award

The Willenhall Amateur Radio Society invites you to apply for its Key Award, which is available on three levels - Gold, Silver and Bronze. This award has an interesting twist - it's based on national STD codes.

To obtain it, you simply exchange QSLs with other UK amateurs and ascertain the STD code for their location, ie Birmingham is 021, Potters Bar is 0707, etc. For the Gold Award you need to log 300 codes and work three Willenhall ARS members; for the Silver it's 150 and two members and for the Bronze it's 75-plus-one. SWLs may also apply by submitting logs indicating that they've heard UK amateurs taking part in this scheme; in addition they need to have heard the Willenhall club station, G4ETW. The levels for each grade of the award are the same as those given above. All bands qualify, and AM, FM, SSB, CW, RTTY and real-time packet can be used. All certified logs, together with a fee of £1 payable to Willenhall & District ARS, should be sent to PO Box 252, Willenhall, West Midlands WV13 3DW. Sounds good.

HMS Belfast Group Award

The London (HMS Belfast) bit of the Royal Naval Amateur Radio Society is sponsoring the 'HMS Belfast Group Award'. The rules of this are a little complicated, but in essence you score points by working certain special-event stations and also founder-members of the group. The award itself costs £1.50, and any surplus cash goes towards the upkeep of the amateur radio station aboard HMS Belfast. For more info, we'd suggest you send an SASE to Don Walmsley, G3HZL, 15 Carters Croft, Upper Tean, Stoke-on-Trent, Staffs ST10 4JB.

c) in the case of contacts with Scottish stations, up to a maximum of three multipliers can be claimed per Region for contacts with different stations within that region

The Membership Services Department should have copies of the information sheet available by the time you read this - send them a stamped addressed envelope if you'd like a copy.

RAE COURSES

It's nearly here; it's time to get your noses to the grindstone and prepare for the next Radio Amateur's Examination. Courses we already know about are:

Bangor Technical College, Castle Park Road, Bangor, Co. Down, Northern Ireland - classes will occupy two evenings per week: Mondays, C&G 765 theory and Wednesdays, operating practice and CW. Further details from Jon Smyth, G14LZS, on 0247 271254 x217 (day) or 0247 467827 (evenings).

Brixton - another RAE course will start at Brixton College in Ferndale Road, London SW4 on 11 September; classes will be held each Wednesday evening from 6.30 to 9pm and you can enrol during the week beginning 4 September. More information from the College on 01-737 2323.

Chingford - another Morse course, said to have a very good pass rate, is available in North-East London. It's at the Adult Further Education Centre, Simmons Lane, Friday Hill, Chingford and takes place on Monday evenings at 7.30pm. The full course for beginners starts in mid-September. Details from Tom Langley, G4PSY on 0992 715168.

Clacton Adult Education Centre, Green Lodge, 180 Old Road, Clacton-on-Sea, Essex - that's where you should enrol, from 11 to 15 September, but the classes themselves will be on Wednesdays at 7pm, from 20 September onwards, at Colbaynes High School, Pathfield Road, Clacton-on-Sea. Further info from Clacton 424151, or course tutor, G3LWM, by letter only.

Coventry - centre for classes for the May RAE is the Henley College, Henley Road, Bell Green, Coventry. Details from 0203 611021.

Hemel Hempstead, Herts - Dacorum College expects to start its RAE classes on 28 September at 7pm. Enrolment will be on 11 September, from 2 to 4pm and 6.30 to 8.30pm. Solicit more details from Brian, G4BIP, on 0442 66337.

Leeds has a C&G Radio Amateurs' Examination class starting on 11 September, and then at weekly intervals every Monday at 7pm. Morse for radio amateurs is taught on Tuesday evenings, with the first one on 12 September. For details contact Frank Stork, G3TEE, on Leeds 554190.

Manchester - North Trafford College of Further Education, Talbot Road, Stretford, has related four courses lined up. The RAE Theory course is to be on Thursday evenings or Wednesday mornings; Morse code will be Tuesday evenings or Wednesday afternoons, Amateur TV will be on Wednesday mornings and Advanced Morse code will be Monday evenings. Enrolment dates are 6, 7 and 8 September; contact 061-872 3731.

Manchester - Pendlebury High School, Cromwell Road, Swinton; classes on Monday evenings at 7pm commencing mid-September. Details from G4HYE (the course instructor) on 061-794 3706 or from Swinton Adult Education Centre on 061-794 5798. A Morse class will also be available on Tuesday evenings, again commencing mid-September, and the instructor will be G4KKI. Details from the Centre.

Newark Technical College - Monday evenings 7-9pm, from September. Fee not yet finalised. Course tutor Alistair, G4YZG. Contact Bert Drury, G1UMK, at the college (0636 705921).

North Lincolnshire College - two-hour classes starting at 7pm commence Tuesday 19 September 1989. Also a Morse class on Wednesday evenings from 20 September 1989. There's a one-evening per week Advanced Radio Amateurs course too, covering everything from receiver and transmitter design/measurement through to satellite systems and packet radio, and terminating in a C&G multiple choice examination and certificate. Enrolment is on 21 September from 7 to 8pm. Further details and reservation from Richard Merriman, G3SIP, Microwave Development Tutor - telephone 0522 510530 or 0427 617471.

Northampton - Enrolment will be on 31 August and 1 September at the Duston Upper School, Berrywood Road, Duston, Northampton, between 1845 and 2100. Alternatively, apply by post anytime during August. The classes will start on 19 September. Further details from the Community Office at the school.

Portsmouth - the 44th year of classes is due to commence. Day: Tuesdays; time: 6.30-8.30pm; contact Len, G6NZ on 0705 819968.

Rugeley Adult Education Centre - classes at the Adult Education Centre, Taylor's Lane, Rugeley commence at 7pm on Thursday 14 September 1989 and continue every Thursday for 22 weeks. They're especially keen to

encourage young people to join, particularly members of cadet forces and Scouts and Guides working for their Communications Badges (minimum age on entry 15 years). The Centre is also prepared to provide a short Morse course if enough people ask for one. Contact John Teece, G4DBR at 3 Trent View Close, Rugeley (0889 582914).

Stockport - classes for the RAE and Morse will be run at the Avondale Evening Centre, Heathbank Road, Cheadle Heath, Stockport. Enrolment will be during the week commencing 18 September; the classes themselves will be on Mondays (Morse) and Wednesdays (RAE), from 7 to 9pm. Further info from 061-427 4730.

Weald College, Harrow, Middlesex - a nine-month course begins on 27 September, at 7pm. For enrolment ring 01-954 9571. Tutor is John Brown, G4UBB.

Winchester's contribution for budding radio amateurs is a Thursday evening series of classes. It begins on 21 September and runs for 30 weeks. Details from Central Hants Community Education Institute (0962 54118) or tutor John Wills, G4AXO (0962 60807).

If anyone else wants to tell the world about RAE courses, Morse courses and what-have-you, we'll be pleased to publish same.

Ex Cathedra?

Special-event station GB0HCC - run by Hereford Amateur Radio Society - went on the air on 28-29 May to celebrate the 800th anniversary of the granting of a City Charter to Hereford by Richard I in 1189. Held in the Cathedral grounds on Spring Bank Holiday, it coincided with a day of activity by the Church authorities. The station was organised in conjunction with the City Tourist Office, who sponsored the club's QSL cards. The Cathedral has, of course, recently been in the news over the proposed sale of the 'Mappa Mundi'.

Beginning on Sunday morning, the station operated from mid-day through to Monday evening; it was well supported by club members and there were eight different operators. The only disappointment was the poor conditions on HF, which limited much of the operation to 3.5 and 7MHz. Nevertheless, 30 countries were worked (including VK) and 350 QSOs took place. The equipment was a TR7 feeding a

132' dipole slung from the side of the Cathedral at about 50'. Not surprisingly, the station attracted a large pile-up, and the club wishes to apologise to those it didn't have time to work at length. All in all, some good publicity for amateur radio; there were many visitors and Errol, G4MET, was interviewed on Hereford & Worcester local radio.

7MHz from Ben Nevis

Peter Waters of Waters & Stanton tells us that on 2 June an expedition to Ben Nevis successfully operated a 7MHz SSB station from the summit using the callsign GB5BN; he reckons that this is the first time that it's been done and we wouldn't be a bit surprised. Peter said that the three ops involved braved freezing conditions and had about 40 contacts in two hours using 2W output from battery-powered gear. W & S provided the equipment and in return obtained a fascinating 90-minute video of the entire expedition with commentary and scenic shots. They're prepared to loan it to any bona-fide club - contact Peter Waters on 0702 204965 between 9am and 5pm or drop him a line. Sounds like just the thing for a wild winter evening!

50MHz developments

Sources which are usually reliable suggest that Denmark and the Faeroes are likely to get a 50MHz allocation soon, probably in the next couple of months. We also hear that other European administrations are looking sympathetically at the possibilities, although 50-52MHz is used to some extent within NATO and it may take some time to resolve some reallocation problems. Watch this space for the latest.

Portugal reciprocates

You'll be pleased to hear that a reciprocal licensing agreement between the UK and Portugal came into force on 8 May 1989. The terms of it go like this. For UK amateurs visiting Portugal, a UK Class A licence is taken as the equivalent of a Portuguese Class A or B.

Able, Boston . . . Yellow, Zulu

We have all heard the amazing array of phonetics used on the bands — but where did they originate?

Over the years we've often wondered how the present-day phonetic alphabet was derived, and indeed an old friend of ours looked into it many years ago with a view to writing something for publication. Unfortunately it never got finished — so imagine our pleasure when the following article fell on to the editorial doormat recently. R W Cornford, G4NGK explains:

"The name is Jim — John India Mexico — and the location is Dayton — David America Yankee Thomas Oboe Norway." An imaginary contact, but one which is quite typical insofar as it demonstrates the use of phonetics which are still being used years after the introduction of a standard international alphabet. Why do they persist, and where do they originate?

It seems that old alphabets — like old soldiers — never die but only fade away; they fade so slowly because it appears to be impossible to 'unlearn' the first alphabet with which one first becomes reasonably familiar. You will frequently hear youthful-sounding stations carefully using current phonetics and then for some reason getting slightly flustered; they then immediately lapse into phonetics which were last used forty-odd years ago when the operator in question was probably wearing a tin hat!

As far as origins are concerned, it is clear that the problem of ensuring accuracy in verbal communications existed long before the advent of radio and the old joke about the message which started out as "send reinforcements, we are going to advance" and ended up as "send three and fourpence — we are going to a dance." That particular one was not only pre-decimalisation but also in all probability pre-1900. However, all joking stopped in 1914 when precision in such things became — quite literally — a matter of life or death, and soon all officers and NCOs of front-line units were familiar with what was sometimes called 'signalese'. By this was meant phonetics covering eight commonly transposed letters. It has

often been stated that this part-alphabet evolved informally but it was, in fact, prepared (except for DON, added in 1914) as early as 1904 by the professional signallers of the British Army — at that time the Telegraph Battalion of the Royal Engineers.

FULL ALPHABETS

Full phonetic alphabets were produced by the United States Army in 1916 and by the Royal Navy in 1917. Rather surprisingly, the British Army did not adopt a full alphabet until 1927, and indeed for some purposes Royal Signals personnel were still using phonetics for only fourteen of the twenty-six letters as late as 1938. Following the entry of the United States into the Second World War, the production of a common phonetic alphabet for use by all Allied forces was obviously essential. One was duly produced early in 1942 and taken into use in June 1943. However, in March 1956 all NATO forces adopted the alphabet currently in use whose origin is discussed later.

Digressing for a moment, one might speculate that it was in the 1914-18 period that troops with little to do devised the comic alphabets of the form 'Ay for 'orses, B for mutton, etc which became quite well-known during the 1920s and 30s; they were extensively featured in theatre and cabaret by Clapham and Dwyer, who were highly popular contemporary entertainers.

In the field of amateur radio, it has unfortunately not been possible

to establish the date at which guidance in the use of phonetics was first given. However, by the mid-1930s the ARRL was suggesting the use of either the US Army alphabet of 1916 with some variations or that used by Western Union. At some point after World War II the ARRL produced the first — and probably the only — phonetic alphabet intended specifically for use by amateurs; this was still being quoted in books produced for the amateur radio market during the 1970s and indeed is still occasionally heard in survivals such as 'Q R Mary' and 'Q R Nancy'. Enquiries suggest that in the inter-war years, British amateurs used either phonetics picked up during contacts with fellow enthusiasts in the USA or those used by the Post Office on international telephone circuits. It has not been possible to date these, although the composition of the 'B' Code strongly suggests 1920-30. Code 'A' may have set the fashion for using names of cities, states and countries as phonetics, and it is interesting to note that a few of these ('Baltimore' and 'Washington' especially) are still widely used.

INTERNATIONAL USE

It seems clear that some early alphabets were constructed on a very unscientific and indeed casual basis; there are a few obviously humorous examples and some words such as CHARLIE are clearly unsuitable. However, when it became necessary in the aftermath of World War II to formulate a phonetic alphabet for international use in the rapidly expanding field of civil aviation, the International Civil Aviation Organisation (ICAO) had before it the results of studies made in the USA and considered during a series of meetings in the late 1940s. Even so, the version eventually approved and taken into use in April 1952 was continually scrutinized in operational use, and changes were made in respect of six letters. The amended alphabet — which included our old friend CHARLIE — came into use in the form in which we know it today in March 1956. It was adopted by all forces in NATO later in the same year and — after twenty years of both civil and military use — was approved for all branches of radio communication by the Big Daddy of all the regulatory bodies, the International Telecommunications Union, in Appendix 16 of the 1976 Radio Regulations. The table opposite shows the various alphabets mentioned in the text; no doubt there are others.

1904 BRITISH ARMY	1916 US ARMY	1917 ROYAL NAVY	1927 BRITISH ARMY	WESTERN UNION	1943 ALLIED SERVICES	ARRL	BRITISH A	TELECOM B	1956 ICAO
A ACK	ABLE	APPLES	ACK	ADAMS	ABLE	ADAM	AMSTERDAM	ALFRED	ALFA
B BEER	BOY	BUTTER	BEER	BOSTON	BAKER	BAKER	BALTIMORE	BENJAMIN	BRAVO
C CAST	CHARLIE	CHARLIE	CHARLIE	CHICAGO	CHARLIE	CHARLIE	CASABLANCA	CHARLES	CHARLIE
D DON (1914)	DOCK	DUFF	DON	DENYER	DOG	DAVID	DENMARK	DAVID	DELTA
E EASY	EDWARD	EDWARD	EDWARD	EDWARD	EASY	EDWARD	EDISON	EDWARD	ECHO
F FOX	FREDDY	FREDDY	FREDDY	FRANK	FOX	FRANK	FLORIDA	FREDERICK	FOXTROT
G GEORGE	GEORGE	GEORGE	GEORGE	GEORGE	GEORGE	GEORGE	GALLIPOLI	GEORGE	GOLF
H HAVE	HARRY	HARRY	HARRY	HENRY	HOW	HENRY	HAVANA	HARRY	HOTEL
I ITEM	INK	INK	INK	IDA	ITEM	IDA	ITALIA	ISAAC	INDIA
J JIG	JOHNNIE	JOHNNIE	JOHNNIE	JOHN	JIG	JOHN	JERUSALEM	JACK	JULIETT
K KING	KING	KING	KING	KING	KING	KING	KILOGRAMME	KING	KILO
L LOVE	LONDON	LONDON	LONDON	LINCOLN	LOVE	LEWIS	LIVERPOOL	LONDON	LIMA
M EMMA	MIKE	MONKEY	MONKEY	MARY	MIKE	MARY	MADAGASCAR	MARY	MIKE
N NAN	NUTS	NUTS	NUTS	NEW YORK	NAN	NANCY	NEW YORK	NELLIE	NOVEMBER
O OPAL	ORANGE	ORANGE	ORANGE	OCEAN	ODOE	OTTO	OSLO	OLIVER	OSCAR
P PUP	PUDDING	PIP	PETER	PETER	PETER	PETER	PARIS	PETER	PAPA
Q QUACK	QUEENIE	QUEEN	QUEEN	QUEEN	QUEEN	QUEEN	QUEBEC	QUEEN	QUEBEC
R RUSH	ROBERT	ROBERT	ROBERT	ROBERT	ROGER	ROBERT	ROMA	ROBERT	ROMEO
S ESSES	SAIL	SUGAR	SUGAR	SUGAR	SUGAR	SUSAN	SANTIAGO	SAMUEL	SIERRA
T TOC	TARE	TOMMY	TOC	THOMAS	TARE	THOMAS	TRIPOLI	TOMMY	TANGO
U UNIT	UNCLE	UNCLE	UNCLE	UNCLE	UNCLE	UNCLE	UPPSALA	UNCLE	UNIFORM
V VIC	VICE	VINEGAR	VIC	VICTOR	VICTOR	VICTOR	VALENCIA	VICTOR	VICTOR
W WATCH	WILLIE	WILLIAM	WILLIAM	WILLIAM	WILLIAM	WILLIAM	WASHINGTON	WILLIAM	WHISKEY
X X-RAY	XERXES	X-RAY	X-RAY	X-RAY	X-RAY	X-RAY	XANTIPPE	X-RAY	X-RAY
Y YOKE	YELLOW	YORKER	YORKER	YOUNG	YOKE	YOUNG	YOKOHAMA	YELLOW	YANKEE
Z ZED	ZEBRA	ZEBRA	ZEBRA	ZERO	ZEBRA	ZEBRA	ZURICH	ZEBRA	ZULU

'ham-radio' is the official name for the annual International Amateur Radio Exhibition held at Friedrichshafen on the Bodensee in the South of Germany, and in recent years there have been a growing number of visitors to the exhibition from the British Isles; many of whom combine a visit to ham-radio with a touring holiday, while others make a 'flying visit'.

ham-radio '89 was held on the 23-25th June at the Friedrichshafen Exhibition Centre, and as usual, the exhibition had a real international flavour with radio amateurs from all over the world in attendance. In fact there were visitors from nearly every single country in Europe. For the second year running, Father Moran, 9N1MM had come all the way from Nepal.

DARC

The Patron of the exhibition is the Federal Minister of Posts and Telecommunications, Dr Schwarz-Schilling, and the exhibition is held under the banner of DARC (*Deutscher Amateur Radio Club*), which is the national society of the Federal Republic, and a member of IARU. The hard work of the organisation of the exhibition is done not by a widely distributed committee, but by the local club, which is — like nearly all local clubs in Germany — a local DARC group. They do an excellent job, as everything always seems to run like clockwork.

ham-radio '89 is the 14th exhibition to be held on the site, but there has been a 'Bodensee Meet' for 40 years. This year was the 40th anniversary of the first meeting on the island of Reichenau in 1949, as well as being the 40th anniversary of the unique 'Amateur Radio Law' which provides for a right to an amateur radio licence, providing the requirements are met. (In most other countries, amateur radio licences are a privilege granted by the relevant authority at their discretion).



ham radio '89

The international emphasis can be seen in the exhibitors as well as the visitors. This year there were more than 130 exhibitors from Japan, the UK, Italy, Sweden, the Netherlands, Switzerland, Austria, and of course the Federal Republic of Germany. One such exhibitor was the Radio Society of Great Britain, which like a number of other IARU national societies had a stand. RSGB books were very popular, as might have been expected, especially *Practical Wire Antennas* which had only been published four or five days earlier and which sold out all the copies on the stand.

NEW EQUIPMENT

ham-radio is often also the place where the large manufacturers announce their newest offerings on the European market. This year saw the announcement by Yaesu of the new FT-1020 flagship transceiver and by Icom of the updated IC-761 which will become the IC-765.

The FT-1020 uses state-of-the-art synthesizer technology, and a single example was on display at the Ricofunk stand (who are the Yaesu main agents in Germany).

The FT-1020 incorporates a complete second receiver, which allows dual, simultaneous reception on two different frequencies. Other features of this transceiver include 14 RF input filters, a claimed dynamic range of 105dB, a quad JFet mixer, notch filter, IF band-pass filters, quartz filters for 200Hz, 600Hz, 2kHz and 2.4kHz, integral power supply, automatic ATU and electronic key.

Japan Radio Corporation's new JRC-135 was also on display a major selling point being its strong-signal handling. It also incorporates a direct frequency digital synthesizer which is not only low in noise but also has a very fast switching time, which is important for digital modes of communication. This synthesizer is now even being used in the Icom IC-725, which is at the bottom end of the Icom range.

The Icom IC765 is an improved version of the IC761. Improvements include a low-noise direct frequency synthesizer and 99 memory channels (as opposed to the 36 of the IC761), as well as a

500Hz CW filter.

Overall, the common theme for new products this year was that of improved receiver performance with special emphasis being placed upon enhanced strong signal performance and 'cleaner' synthesizer design.

INTERNATIONAL

Friedrichshafen is also an occasion for international contacts — many representatives from IARU national societies were there. There were two meetings arranged, with facilities being provided by DARC to enable an informal exchange of information and views. One of these was the regular Friedrichshafen International Meeting similar meetings have been held at Hanover and Birmingham.

The other meeting was specifically convened to deal with the relationship between Amateur Radio and the European Community. The move towards completion of the Single European Market in 1992 has a large number of implications for the Amateur Service, and it was decided to set up a special body operating within the framework of IARU Region 1 to deal with this. It is foreseen that one of its major tasks will be in the field of EMC.

The cost of entry to all three days of the exhibition is DM 12.00 (about £4.00). A single day-ticket can also be bought, but as this is DM 7.00, most visitors buy the 'season ticket' which includes a souvenir badge.

Camping and caravanning facilities are provided on site at the exhibition, while other visitors can stay in one of the many hotels and guest-houses which, like most German towns, are excellent value for money, even in these days of a somewhat depressed pound. Equipment is also somewhat cheaper than in the UK, but watch those Customs allowances! G4JIF



(top) View of the International Societies hall
(left) A good deal of impressive local engineering was on display.
(above) Stands in the retailers hall were always busy.

AMATEUR RADIO AWARDS BOOK

THIS NEW EDITION of Amateur Radio Awards gives details of major radio amateur awards throughout the world. Each award is listed in an easy to understand format giving full information on how to achieve the award. An innovation for this edition is the provision of checklists so that the amateur can keep a record of progress.

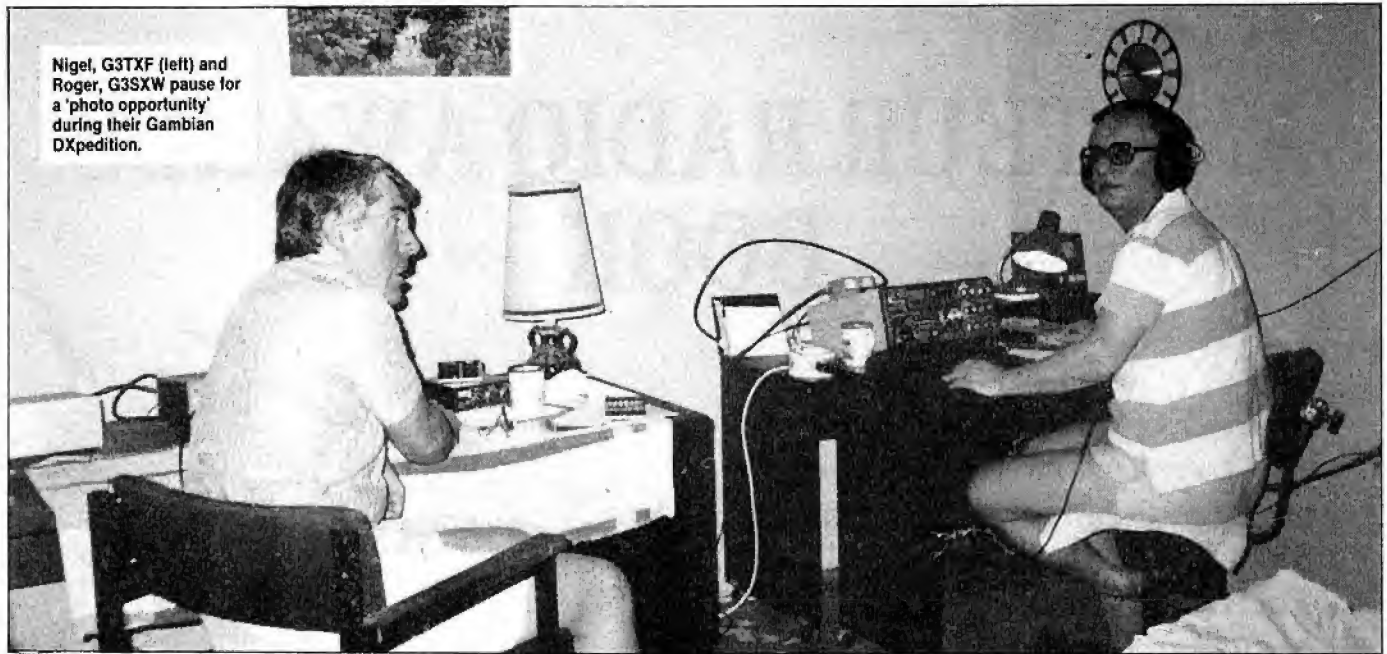
This book is essential reading for the avid award hunter and the DX chaser alike.

**AMATEUR RADIO
AWARDS BOOK
IS AVAILABLE
AT**

£7.95

**to RSGB members
by post**





Nigel, G3TXF (left) and Roger, G3SXW pause for a 'photo opportunity' during their Gambian DXpedition.

The Gambia – A DXpeditioners' Tale

What makes The Gambia so good for DXpeditioners? Well, it's rare enough to offer huge pile-ups; it's reachable and affordable; licences are available; the country is fascinating, the climate marvellous, the beaches idyllic, the people welcoming. What more could one ask? But, a word of caution – it'll soon be the tourist hot-spot of the 90s, so enjoy it while it's still so sought-after on the HF bands.

Why do we go DXpeditioning? Good question. There's a new medical condition called "pile-upitis": roughly speaking, this means that when 'SXW and 'TXF haven't been on the DX end of a pile-up for a few months, we suffer withdrawal symptoms! We get moody and spend hours staring balefully at world maps, dreaming about the cacophony of hundreds of CW signals ripping our ear-drums apart. Sounds masochistic, but we

With the final part of our DXpedition competition being published this month, Roger Western, G3SXW, gives us a timely insight into just what the winner can expect when they begin operating from The Gambia.

find it highly invigorating to cram the maximum number of QSOs into the time available! The adrenalin really flows, and it's more than just our own enjoyment: it's also knowing that it gives pleasure to all those that we contact.

CHOOSING WHERE TO DXPEDITION

We are HF men, CW operators, DX-chasers and very committed to all three aspects of amateur radio. However, most of the ground rules about where to go apply to anyone feeling the symptoms of pile-upitis or getting the wanderlust: choosing the DX spot means balancing the advantages and disadvantages. The opportunities relate to DXCC rarity, and the potential for making a great number of contacts in a short period; restraints include

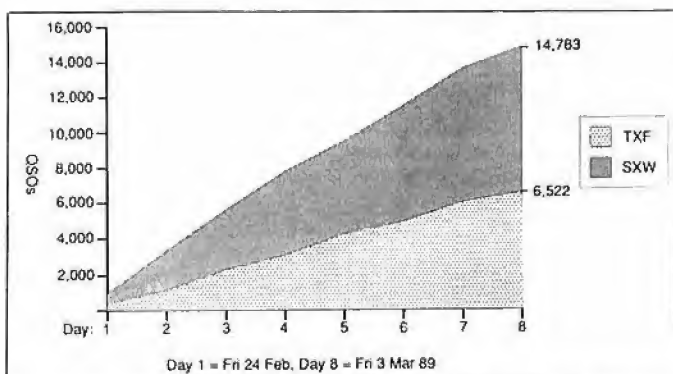


Fig 1. Growth of the cumulative QSO tally over the DXpedition period. Final totals were: C56/G3SXW — 8261, C56/G3TXF — 6522, Overall total — 14783.

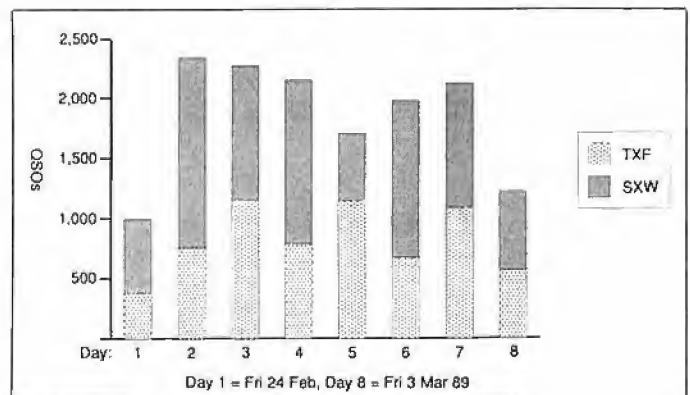


Fig 2. QSOs per 24 hour period.

time, availability of transportation, money, physical hardship, and things such as transmitting licences and customs difficulties.

Two fundamental laws of nature apply. Firstly, the rarer the DXCC country the more it will "cost" in one or more ways – for instance, if you want massive pile-ups from a rare Pacific island, it will take a lot of organising and a great deal of time and money. On the other hand, if you drive to Luxembourg you'll soon find that it's not rare because thousands of DXpeditioners have been there before you. The harder it is to get to a given spot, the more DXers need the QSO.

Secondly, there's a balance between the tremendous satisfaction of being totally independent, taking all the gear and antennas with you, setting up and bringing it all back again and the comparative ease of "guesting" from an already established station, which of course much reduces the time and effort in planning the DXpedition. Weighing up all these factors is down to the individual. This trip, as it happens, was dictated mostly by time constraints: we couldn't afford too much time in the set-up phase or in travelling.

So we knew what we were looking for: a rare DXCC country with licences available but only one week available for travelling and operating. When we heard that Ernie Sumption, C53GS, would welcome us in The Gambia it sounded like a winning formula. A five-hour charter flight from Gatwick at a sensible price would make the journeying feasible. So – two phone calls to Ernie plus two skeds on 21MHz, two calls to Serenity Holidays and two weeks later we were on a wide-bodied jet to Banjul.

Ernie had fixed the licences and had a rig and beam already installed. For a second station we took a transceiver, a vertical and a 3.5MHz dipole. We were on the air with two call-signs and two stations within two hours of landing at Banjul.

THE PILE-UPS

The first QSO by C56/G3SXW was with DL9OE at 1706GMT on 24 February 1989 on 28MHz: the antennas were obviously working fine. Believe it or not, the first problem was where to point the beam! It's extremely disorientating to switch on from a strange part of the world when you don't know where anywhere is. We knew Europe was somewhere to the north of us, but what about JA and VK/ZL?! At this stage, a small confession. On every trip, something gets forgotten. This time we didn't take beam headings... As things turned out, we pointed the beam northish the whole week

Band	C56/G3SXW	C56/G3TXF	Total
80	205	298	503
40	670	841	1,511
20	2,563	1,437	4,000
15	2,145	1,877	4,022
10	2,677	2,069	4,747
Total	8,261	6,522	14,783

Table 1. QSOs by band.

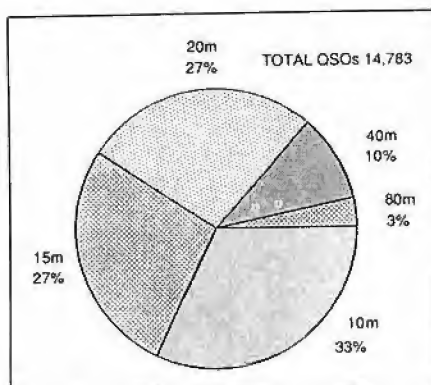


Fig 3. Pie chart band by band analysis of contacts (total QSOs = 14783).

because Europe, JA and W/VE all come from that general direction.

We soon realised that the best paths on the HF bands were to western Europe and the east coast of the USA. Signals from G were big most of the day: our first QSO into England was with G0CKP, but it was much trickier on the LF bands where QRN meant the band had to be wide open to hear anything at all. Actually, the whole trip was almost made worthwhile solely for the lessons in propagation from the equatorial zone; we had night-time openings on 28MHz (and mid-afternoon absorption closing all but 28MHz), absence of polar flutter to W6/VE7/KL7, the huge PY signals and USSR on second hop instead of first. All very different from what we are used to back home.

On that first weekend especially, the pile-ups were mammoth! There were mostly European callers late mornings, but in the hours of darkness the HF bands were open to all parts of the world at the same time. Then the Europeans were joined by the USA and Japan and it became difficult to sort

out callsigns from the tremendous number of callers. We operated around 023kHz on the HF bands, asking callers to transmit one or two kHz higher. Sometimes the pile-up spread for 5kHz or more but – not wanting our activities to cause QRM for other band users – we didn't ask callers to spread out any wider.

The priority was to have contacts, and contacts were just what we got. The peak QSO rate was 163 in a single hour, and we finished with 14,783 QSOs between us in seven days operating – that's an average of just on 100 contacts for every operating hour. These were all on CW; apologies to the sideband DXers but we just "forgot" the microphone! Actually, CW is our preferred mode but we didn't feel too bad because there are generally far more DXpeditions on SSB than on CW.

MAXIMIZING CONTACTS

Given the wish to make the maximum number of contacts, we went to whichever band offered the fastest rate. Here we must applaud North American and JA operators for being speedy and efficient on the other end. Unfortunately, callers from Europe were noticeably more prone to time-wasting. European DXers sometimes lose out when a DXpedition prefers to work W or JA pile-ups, basically because pile-ups into Europe often lead to lower QSO rates. The reason is simple – the European DXer tends to make long transmissions and ask "QSL via?" and "call?" Also, European callers are generally more prone to the practice of non-stop calling that has become so prevalent these days. This reduces everyone's chances of making a QSO and is poor operating procedure. When the DX station calls "QRZ G3?" the wall of noise from just about every other European prefix merely delays the proceedings.

Maximising the number of QSOs is to everyone's benefit. The quicker a QSO is satisfactorily completed, the quicker the next caller can get through. Ideally, the DX station needs to be clear with instructions, callers need to abide by them and everyone needs to be brief.

CRACKING THE PILE-UPS

Based on our experience of being on the wrong end of some monumental pile-ups, here are some thoughts about how to crack them. First let's assume that the antenna has already been sorted out and is known to be working well; obviously a big signal makes it easier to get through. Having said that, what are the best ways to get through a

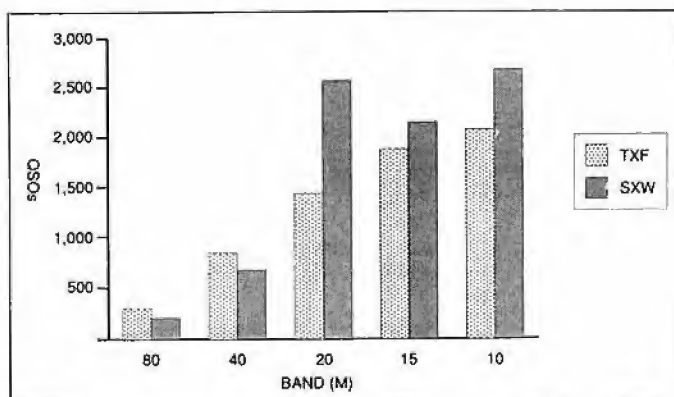


Fig 4. Histogram of QSOs by band.

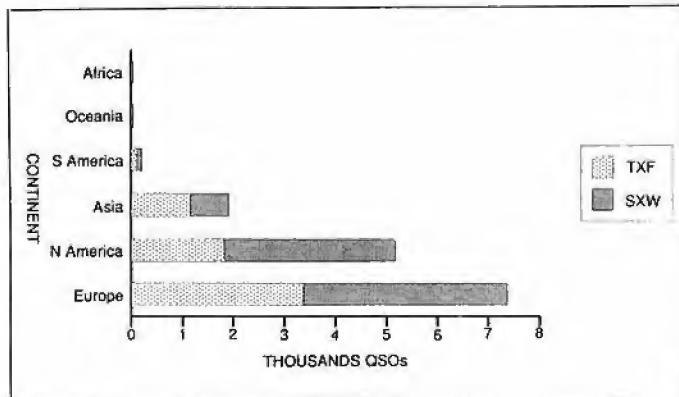


Fig 5. Analysis of contacts by continent.

big pile-up with a small or medium signal?

There are three indispensable elements. First, listen for a while before starting to call. It's unlikely the DX station will go QRT while you check his operating rhythm and his listening frequency. To find his receive frequency is not always easy if the pile-up of callers is very wide or if the DX station is working into an area that you can't hear. Use the RIT (or preferably split VFOs) and spend time finding the frequency of the station he's working. Keep checking to see if that frequency moves by tracking several QSOs.

It's pretty obvious that there's a much greater chance of getting through if you transmit exactly on the frequency monitored by the DX station. However, there is one exception to that rule: if the pile-up calling frequency is so full of big signals that you don't think you'll ever get through, try calling just off to one side. Sometimes the DX operator finds that so many stations are calling on the same frequency that he can't decipher a call-sign so he shifts his receive frequency slightly. Often a pattern can be detected, so you can guess which will be his next receive frequency and call him on a quiet channel. "The Complete DXer" by W9KNI is highly recommended reading on this topic. So that's the second rule: choose the transmit frequency carefully and remember that most pile-ups use split frequency so do not cause

Thirdly, when transmitting, BE BRIEF! The DX station knows his own call already and realises you are calling him, so don't waste time giving his call. Most importantly, transmit at precisely the correct moment - when the DX station has just completed a QSO. Again, the trick is in listening - don't transmit unless and until the DX station is ready to welcome the next caller. When you do get in QSO, transmit only a signal report and your call-sign once, listen for confirmation and give a repeat if requested.

NO TIME FOR SLEEP

We only had seven days so we didn't sleep much and - regrettably - saw much less of the fascinating Gambian wild-life than we would have liked. In fact we didn't see much other than through the shack window, although this included a fantastic variety of beautiful African birds and many lizards. There are very few insects, but that may be seasonal. In February/March humidity is low but temperatures are in the nineties, making it extremely comfortable. In England we usually assume that anything over 80° is unbearable, but that's because of the high humidity which is so common here.

Daily routine? There wasn't one! We slept when exhaustion prevented accurate CW, took showers and broke for meals with Ern and Anna (my goodness, can they cook! Ernie's soups are outstanding and Anna must have felt we were still growing lads - the dinner-plates were groaning under the weight). We forced ourselves away from the pile-ups for two brief trips along the coastline, although admittedly only when mid-afternoon ionospheric absorption killed propagation! Night-times were best for the QSO rate, being so close to the equator, so we slept as much in the day-time as at night.

THE RESULTS

It was heart-breaking to have to say finally to the pile-up 'QRT NW 73' but it had to be done because our flight back to Gatwick wouldn't wait any

Continent	C56/G3SXW	C56/G3TXF	Total
Europe	4,002	3,377	7,379
N. America	3,362	1,825	5,187
Asia	764	1,156	1,920
A. America	94	111	205
Oceania	21	26	47
Africa	18	27	45
Total	8,261	6,522	14,783

Table 2. QSOs by continent.

Country	C56/G3SXW	C56/G3TXF	Total
W	3,143	1,718	4,861
JA	623	981	1,604
DL	438	346	784
UA	377	302	679
G	347	329	676
OK	283	255	538
YU	264	254	518
I	301	216	517
UB	251	231	482
SM	216	160	376
SP	191	155	346
Y2	171	160	331
OH	158	135	293
VE	178	88	266
UA9	119	127	246
All others	1,201	1,065	2,266
Totals	8,261	6,522	14,783

Table 3. QSOs by country.

longer! Last in the log was K3YGU at 1315GMT on 3 March; the last from the UK was G4OBK a few moments earlier, on 28MHz.

We had made the target of 12,000 QSOs a day or two earlier and were struggling to make 15,000 - always setting a new target if the previous one had been reached! These targets were based on the number of QSOs that Ian, G3WVG and Nigel, G3TXF had made while operating for a similar length of time as 8Q7VG and 8Q7XF from the Maldives Islands in April 1988. Fig 1 shows the daily QSOs growing towards the total of 14,783 contacts. We were more than pleased with the result and left contentedly exhausted. Log analysis was planned

for the flight home but we just fell dead asleep instead!

QSLs

After a brief recuperation period at home there came two post-expedition priorities; QSLing and log analysis. To date we have each received over 700 direct QSLs and batches are arriving from the bureau already. Our cards have been printed and every QSL will receive a reply without fail.

QSO ANALYSES

From analysis of the logs we see the operating story. Fig 2 shows the spread of QSOs through the day: hours of darkness were best for propagation. Table 1 shows a band-by-band analysis, also described in Figs 3 and 4. Most QSOs were on the HF bands of course. While those LF QSOs were harder work, each one was valuable because more DX-chasers needed C5 on the LF bands than on HF.

Table 2 and Fig 5 show the spread of contacts by continent, with Europe and North America dominating the scene - obviously because this is where the majority of amateurs live. Table 3 explains this more fully. One-third of all QSOs were with USA as a result of good propagation to that area, and because there are so many HF DXers there!

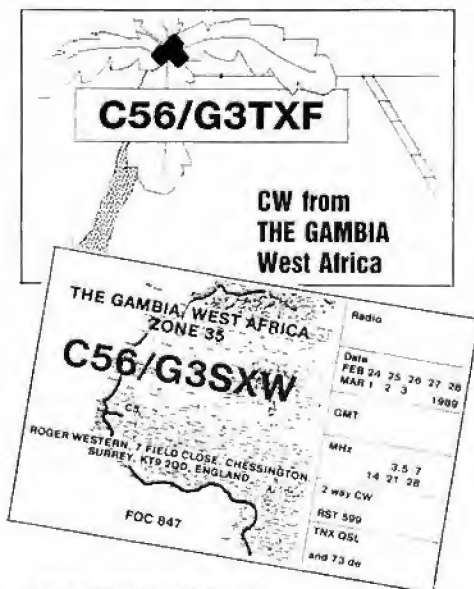
Only ten stations worked C56/G3SXW on all five bands: many thanks to K1DG for being first! He was followed by K2TQC, K2QAR, W4VQ, K2TE, K4II, F6BHK, G3JZI, Y22JD and ON6KD. Some 60 stations were worked on four bands, the 3.5MHz QRN at our end hardly being their fault! On the down-side, 7% of all QSOs were 'dupes' (same station on the same band) and some stations called in as many as four times on the same band - a bit selfish when so many others are waiting in the pile-up. The Gs were very good, at only 4%, but over 10% of all QSOs with UA, UB, HA and YO were duplicates.

AND NEXT...?

All that pile-up operating and all that QSLing/analysis keeps us out of mischief for a while and cures the pileupitis symptoms - but not for long. What next? There are two things to think about; we are also keen contesters, so where to go for WorldWide Contest this November and where next for a dose of pile-up operating? Where better than The Gambia? It's got what it takes in all departments and a second visit is very tempting, especially with the new C53GS hotel with beam installed and a glorious take-off over the Atlantic Ocean.

Our heartfelt thanks to Ern and Anna Sumption for their fantastic hospitality - they couldn't have done more for us, making sure the expedition was a great success. Also to the RSGB - in particular Jim Smith, G3HJF - for help with our early enquiries; to Serenity Holidays for their great efficiency organising the travel and to the Gambian PTT for rapid issue of licences. Especially, my thanks to Nigel Cawthorne, G3TXF, for help with this article, plus all the graphics and photography. C U IN THE PILE-UPS.

Editorial note. Further details, (including a brochure) concerning Serenity Holidays may be obtained from: The Gambia Experience, Serenity Holidays Ltd, 17 Bell Street, Romsey, Hampshire SO51 8GY. Tel: 0794 514646



The two DXpedition QSL cards.

SPECTRUM ANALYSIS

HF

JOHN ALLAWAY G3 FKM

BAND REPORTS

A good turnout with reports received from G2s AKK, HKU, GM3CSM, G3s GVV, KSH, YRM, G4EHQ, GM4ELV, GW4KGR, G4s MUW, NXG/M, OBK, SJG, XRV, ZYQ, and G0s BXQ/M, CKP, DFA, HGA, IHB, and GM0KMKJ - to whom many thanks. CW call signs listed in italics.

3.5MHz

0000 P3AA
0100 4J1FS

7MHz

0000 CY0SAB, VP2EHF
0100 C6AZY, FS5T, VO5AC (Zone2)
0200 JY9LE, SO1DX, V27T
0300 CE0ZAM, OD5VT
0400 T19FAG
2000 T50DX
2300 FS5R, V27T

10MHz

0400 LU5HDJ
0500 K6CBL
0600 9H1BB
0700 W11QS/6, ZL4HB
2000 EA6ZY, OY4QN, 4J1FS

14MHz

0000 CY0SAB
0100 CE0NKY, FS5T
0500 VK0GC
0700 VK9NL/JW, T30MT, VK0GC, ZL7TZ, 3D2AG
0800 KL7QR, VK9LH
0900 KC4USV, KL7U
1200 OH2AP/OH0M
1400 FV4ITU
1500 KN0E/KH3, T33JS
1600 T33JS, V85AH, Y11BGD
1700 ZS8MI
1800 3V8AZ, A35AA, FR4FD, 5H1HK, 8J5ITU
2100 KL7PJ, TT8CW, VP8BXQ
2300 ZL4BX

21MHz

0200 VP5S
0600 ZK1TB, 3D2CR
0700 C9MKT, UW3HY/1, 5W1IB
0800 FO5FO, KH0AC, KH6BOG, ZK1BD

0900 KL7XD
1000 FK/JH9KVF, ZL, 4J1FS
1100 A41JR, BY4RB, N7DF/WH2, T32AB, TZ6LP, 3D2RW
1200 T5YD, VQ9LW, 3X1SG
1300 HS1WD
1400 A41JR, BY4WNG, D68TW
1500 ZF2NE/ZF8, 9V1YL
1600 T33JS
1700 HS1BV, KH6CF, T5MF, 9Q5XX
1800 HS1BV, JT1T, ZY0SS, 8Q7AC
1900 BY4WNG, PY9FF, T19FAG, V85GA
2000 AT0T, HL4SF, JAs, VKs, ZL4OP
2100 T33JS, V27T, 6T2MG
2200 CE0DFL, S0RASD, T50DX, VR6ID
2300 T19FAG

28MHz

0700 TL8WD, ZL4BO
0900 HL9EP
1000 HS0B, KX6DC, OH2AP/OH0M, YK1AO, 5H0T
1200 P29NCS
1300 A22AA, T50DX
1400 VP8BWG, XF4L
1500 D44BS, D68TW, FR5FO, S83B, ZY0SS
1600 D68MG, HH0T, ZS6UN/G4THM, 9V1OK
1700 FS5T, TR8RC, V85GA
1800 HL5BDS, 9M2DA
2000 V21CW, 6W1AAD, 8Q7AC
2100 KG4FB
2300 ZL4LZ

I would like to thank all those who contributed this month and also the writers of *DX Report* (VK9NS), the *Lynx DX Group Bulletin* (EA2JGO), *DXpress* (PA3CXC), *CQ Magazine* (W1WY), the *DX Bulletin* (VP2ML), the *Long Island DX Bulletin* (W21YX), *DX News Sheet* (G4DYO), and the *Ex-G Radio Club Bulletin* (W8TGA).

For the October issue please let me have your letters by **23 August** - and please note that this is **abnormally early**.

OWN CALL PREFIXES AND SUFFIXES

Did you ever wonder why it has now become more common to find stations operating from another country using the prefix of the place being visited *before* their own call sign? Les Parnell, G8PP/VK3GFO, has written to say that when he is operating as G8PP/VO2 and calling a UK station, the latter often seems to stop listening and calls "CQ" again - apparently not having bothered to read the whole call sign! It was for precisely this reason that IARU member societies agreed some time ago to ask their administrations to issue visitors' call signs with the country identifier as the prefix instead of the suffix.

QTH CORNER

AP2NK	(see AP2RYL)
AP2RYL	PO Box 1944, Islamabad 44000, Pakistan
D68TW	K3ZO, Fred Laun, POB 31097, Temple Hills, MD 20748 USA
FS5R	W7EJ, 21060 Turner Lane, Hillsboro, OR 97123, USA
FS5T	A17B, 13162 NW McNamee Rd, Portland, OR 97231, USA
FS5DX	WB7RFA, Box 463, Lake Oswego, OR 97034, USA
OH2AP/OH0M	Box 90, SF-04401, Jarvenpaa, Finland
S01DX	EA3AOC, Box 291, 08700 Igualda, Barcelona, Spain
U9W/W6/G3MHV	PO Box 426, Beverly Hills, CA 90213-0426, USA
and U9W/KA6ZYF	G4ISK, 8 Crown Place, Owlsmoor, Camberley, Surrey, GU14 4UA
ZS3UN/G4THM	(see text - please do not QSL via OH5NZ, A.Ahlbom, Puustellintie 3E, SF-53200 Lappeenranta, Finland)
3V8AZ	
4J1FS	

Happily this is already the case in many places.

XF4L DXPEDITION IN A NUTSHELL

Jarmo, OH2BN, has very kindly sent me a press release concerning the recent XF4L expedition and it goes as follows: "Revilla Gigedo Is are located 450 miles off the coast of Mexico in the Pacific Ocean. The archipelago consists of three small islands and two adjacent rocks. The island of Socorro is 24 miles long and 9 miles wide and its volcanic peak rises slightly over 3700ft. The island is manned by a small military garrison situated behind the island (radio-wise). XF4 has always been considered a mysterious place, especially by Europeans of whom only a handful had made contact with the island before.

"Following a four-hour flight, our Beechcraft King Air plane touched down in a strong tailwind, barely managing to pull up on Socorro's short runway. A total of 6600lb of gear and supplies were set up on

three separate sites high up on the volcano to provide clean operating on CW and SSB simultaneously and to take full advantage of narrow propagation windows. The tent and generator-based XF4L was in operation.

"The final tally of 49,943 QSOs included 15,000-plus Europeans but it also involved what could be considered the ultimate achievement in DXpeditioning. Amateur radio was established permanently on the island, when the island's commander was trained and made operational. When you hear Fernando, XF4F, give credit to ICOM and NCDXF - they provided a complete station for him.

"While not on operating duty, XF4L team members participated in a variety of activities all the way from fishing and climbing the peak of the volcano to socialising with residents of the local naval base.

"Making the XF4L operation possible relied on worldwide support and we are proud to acknowledge our supporting audience.



Operators of the recent XF4L expedition. (Rear) N7NG, (middle row l to r) OH2BU, XE1L, W6RGG, JH7RHF, OH2BH, (kneeling l to r) XE1XA, XE1DH.

"Full-colour XF4L QSL cards are expected shortly and log data for all 47,000 QSOs is currently being fed into computers for the printing of QSL labels."

Jarmo added a newflash at the end. "On 13 June Fernando, XF4F, operating the equipment donated to him by the expedition crew, managed to save two lives. He used it to contact XE3EB to ask the Navy to send an aircraft to the island to pick up two seriously ill people. Luis, XE1L, said that while official communications failed, it was possible through amateur radio to perform this life-saving act."

DX NEWS

There is now a second station on from the **United Arab Emirates**. This is Dr Mohammad Hamdan Abdullah, who is located in Dubai and has the callsign A61AC. He has been worked on 14MHz SSB and I have just had the pleasure of meeting him, so I know that he's genuine! Until now, the only legally licensed and active A6 has been

Khalid, A61AB. There is also a report that A61AE will be on the air soon. A51PN, in **Bhutan**, has confirmed that he has not been active since 1982 - thus proving that all more recent "A51PN"s have been bogus.

9H1CM, who is not active at the present time, has written to say that he is receiving QSLs for contacts on 3.5 and 14MHz CW. Maltese stations are allowed to use the 9H25 prefix for the rest of 1989 to commemorate the 25th anniversary of Malta's independence.

At the time of writing S01A was being reported to be very active Mondays to Wednesdays on 21 and 28MHz in the afternoon and on 14.330MHz around 1930, with 7.050MHz from 2100. PA3CXC may be in **Southern Sudan** for six months with a Technical Delegation and he is said to have permission to take equipment. TZ6MG will be stationed south of Juba for one year but is not taking equipment with him. He will try to obtain operating permission later in the

year and import his gear afterwards. There seems to be more activity from **Somalia** in the shape of N4CT, who will be there for two years and who has the callsign T5CT. 5Z4BH may have a 9U licence by now and also hopes to be able to be on the air from 9X, 5H, and D6 - particularly on RTTY. If you need **Mayotte**, try looking for FH8CB - he's very often in the vicinity of 14.230MHz from 0400. From **Sao Tome** S92LB frequents 21.285 or 21.273MHz around 2100 or later. ZD900, claiming to be on **Tristan da Cunha**, is a pirate.

The 1989 USA National Scout Jamboree at Fort A.P. Hill in Virginia will be on the air from 2 to 9 August as K2BSA/4. A total of 34,000 Scouts and Guides from 34 different countries will take part.

Now some very sad news about the operators of the recent 3V8AZ activity. Marcel Aouizerate, F2SA, and Henri Belmont, F1HJW, were returning to France in their light aircraft when it crashed into a mountain and both were killed.

Please do not send QSLs until the situation is clearer. If the logs can be recovered, the French DX Foundation will try to confirm all contacts in memory of the two who died.

The **Banaba** is expedition by VK9NS and KN6J (T33JS/T33RA) made over 27,000 contacts. According to *DXpress*, Bing, VK2BCH, is scheduled to be on **Rotuma** until 8 August and his callsign is 3D2XV - if you work him, send your QSL direct with return postage since he does not respond via the bureau. If you missed **Conway Reef** and it turns out to be a new DXCC country, OH1RY and OH2s BAZ, BGD, and BV are planning to be there from 3 to 13 November as 3D2RY. Other places to be visited include YJ0RY (by OH1RY, during the CQWW DX SSB contest) and either 3D2VV or **Wallis Is** (FW call not yet known) by OH2BAZ. This expedition will run from 19 October to 23 November. Donations would be welcomed and should go to Pekka Kolehmainen,

HF F-LAYER PROPAGATION PREDICTIONS FOR AUGUST 1989

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3.5MHz
000001111122	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
024680246802	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802
•• EUROPE								
MOSCOW	.....1..	.....111.131.	....333334641	1.2555556873	635655556898	8753333334689	7521.....1368	42.....35
MALTA	.....1..	.....11111131.	1..344444642	311666666875	864766667899	9985333334689	886311111478	+3.....4+
GIBRALTAR	.....1..	.....1..	.....2222142.	1..244444652	632676666897	9877544444689	887421111478	+4.....4+
ICELAND	.....1..	.....1..	.....2222142.	.....1111331	2..235444775	754644444678	776421112346	453.....23
•• ASIA								
OSAKA	.....1..	.....111.1..	....121112111	....131113342	.....1..2574	.....361	.....13.	.....
HONGKONG	.....1..	.....11111231.	....122224641	1..11124763	.....2686	.....375	.....142	.....
BANGKOK	.....1111221.	....12222342.	....113235752	2..11124885	4.....2688	3.....377	.....145	.....2
SINGAPORE	.....1111221.	....22322452.	1..123235762	2..11124885	5.....2688	3.....378	.....145	.....2
NEW DELHI	.....111121.	....122322421.	1..1223235542	311..1124774	62.....2688	5.....378	3.....146	.....4
TEHRAN	....22222331.	....1333335531	214322336874	5352..125887	863.....2689	851.....378	62.....146	.....23
COLOMBO	....22222331.	....1333335531	211213336874	52.....125887	83.....2689	85.....378	62.....146	.....23
BAHRAIN	....33333421	1..2433445642	324322336876	6451..115898	973.....2689	85.....378	62.....147	3.....24
CYPRUS	....33333421	1..1555556642	424766667874	757755567898	987522335799	9852.....12589	862.....257	53.....24
ADEN	1.1334545532	212444556754	645412246888	8662.....25899	985.....2689	862.....378	73.....157	4.....24
•• OCEANIA								
SUVA/S	.....1..	.....111.1242.	....22373.....73	....321.1363.	....152.....152.	....3.....3.	.....1..	.....
SUVA/L	31.2.....53	32141.....74	22373.....73	....1473.....261	....261.....53.	....3.....3.	.....1..	.....
WELLINGTON/S	.....1..	.....22111..3.	....22111..3.	....142111..51	....251.....1251	....3.....33.	.....1..	.....
WELLINGTON/L	21.1.....22	4313.....44	44462.....76	34573.....175	....1462.....462	....23.....33.	.....1..	.....
SYDNEY/S	.....1..	....22111..23	....1432221..1	....15311221..3	....31.....244	....1.....361	.....1..	.....
SYDNEY/L	1..1.....1	21.12.....23	321341.....55	2115411..76	....51.....284	....2.....21	.....3.	.....
PERTH	....22221..	....134432.	211253332..	41113112321.	51..1..254	2.....374	.....144	.....22
HONOLULU	....22221..	....1..	....111.121.	....111.1231.	....241.....12.	....23.....	.....1..	.....
•• AFRICA								
SEYCHELLES	1.1334545432	212434556654	645312346888	8651..125899	983.....2689	861.....378	73.....157	4.....24
MAURITIUS	1.1334555633	3.2545557765	725423336888	9562..115899	974.....2689	861.....378	74.....157	4.....24
NAIROBI	211444566643	422544567866	865522236999	9873..14899	997.....1689	884.....378	761.....147	43.....24
HARARE	311344667754	632544667877	875622236999	9985..14899	9983.....1689	986.....378	773.....147	44.....24
CAPETOWN	....344677853	....565567976	3..753336998	62.841114899	97261.....1689	8953.....378	774.....147	44.....24
LAGOS	32.244667854	642564457986	975752126999	99773.....4899	9986.....1689	8973.....378	6741.....147	34.....24
ASCENSION Is	31..4445652	43136446874	874163246898	997441..2799	99851.....589	8873.....268	7741.....46	44.....4
DAKAR	21.143455752	43136446874	864653127998	987741..699	99862.....389	9873.....68	7741.....36	442.....4
LAS PALMAS	....22232421	1..244454652	531576676886	864776666898	998764334699	99853111.1479	8862.....157	+3.....25
•• S. AMERICA								
StH SHETLAND	.....565751	.....1566872	....2335895	2.....1113888	72111.....678	8762.....356	6741.....24	342.....
FALKLAND Is	21.....2465642	421..3566774	7632..3335787	986412113689	99862.....368	9973.....37	7741.....14	452.....
R DE JANEIRO	11..3454542	321..4454664	763224322587	9865321..389	99862.....69	8873.....38	7641.....16	432.....3
BUENOS AIRES	1.....3354542	32..24454664	753513333477	98572211278	99861.....48	8873.....16	7741.....4	442.....
LIMA	....121221	2.....21232343	531242231136	76354111..27	98762.....5	7973.....2	5741.....242	.....
BOGOTA	....1111221	1.....12222233	42.233221135	75244211..16	89662.....5	7973.....2	5741.....242	.....
•• N. AMERICA								
BARBADOS	....1121221	1.....13222343	531243211156	7635421..37	99762.....17	8973.....4	6741.....1	342.....
JANICA	....1111111	1.....1111222	31.112221125	4412321..5	88552.....3	6873.....1	3741.....4	.....
BERMUDA	....1111121	1.....1111232	31.112221145	6412221..37	88552.....6	7873.....3	4741.....4	.....
NEW YORK	.....1..	.....1..122	....1111134	52.1.111..26	77441.....5	5863.....2	3641.....3	.....
MEXICO	.....1..	.....1..111	2.....111112	42.1.111..1	56442.....	2763.....	441.....2	.....
MONTREAL	.....1..	.....121	2.....1111134	42.1.111..126	76331.....5	5863.....2	3641.....3	.....
DENVER	.....1..	.....1..	1.....1..2	31.....1..2	4433.....	1563.....	241.....	.....
LOS ANGELES	.....1..	.....1..	1.....1..1	2.....1..	1333.....	363.....	141.....	.....
VANCOUVER	.....1..	.....1..	1.....1..1	1.....1..1	12231.....	253.....	31.....	.....
FAIRBANKS	.....1..	.....1..	.....1..1	.....1..1	1242.....	23.....	.....	.....

The provisional mean sunspot number for June 1989, issued by the Sunspot Index Data Centre, Brussels, was 196.0. The maximum daily sunspot number was 265 on 16 June, and the minimum was 130 on 7 June. The predicted smoothed sunspot numbers for August, September, October and November are respectively: (classical method), 182, 182, 182 and 180; (SIDC adjusted values) 190, 190, 189 and 188.

Box 29, 21531 Paimio, Finland. VK9LA on Lord Howe Is is there for three years and has been noted between 14.222 and 14.232MHz between 1100 and 1200.

Peter, PA0CRA, will be in the Caribbean area between 13 and 29 August. His P40PJ call will be used for a few days but he will probably spend most time on Anguilla as VP2EPJ. He prefers SSB. VP8BUB is still on Bird Is S. Georgia and to be found quite often on 28.495MHz around 1600 when he keeps a schedule with his QSL manager. XF4F is Fernando, the naval officer trained by the recent XF4L dxpedition group. He is on from Revilla Gigedo at weekends and the DX Bulletin says that 14.3MHz is the right place to look - at 1600 on Saturdays and 1500 on Sundays. An expedition to Sable Is by VE1s AL, BHR, XT, and W5KNE is provisionally scheduled to take place between 5 and 12 August.

Iris and Lloyd Colvin have been working from various locations within the USSR. They use the callsign of the club station from which they are operating/their callsign. Terry, W6/G3MHV has just been in the USSR in Ufa (UA9W) and both he and his wife Mady were given reciprocal callsigns - U9W/KA6ZYF and U9W/W6/G3MHV. These would seem to be the first issued for the U9W area. See QTH Corner for QSL information. UB5JRR and others will be in Oblast 100 this month and have asked for a UU9 prefix.

US/SOVIET BERING SEA BRIDGE EXPEDITION

The winter 1988/89 co-operative US/Soviet Bering Sea Bridge Expedition has reached a successful conclusion. The venture took place between 23 February and 10 May 1989 by ski and dog-sled across the Bering Straits. The route was from the Soviet city of Uelen to Big Diomedes Is, thence to the US side of Little Diomedes Is, to Wales, Alaska and then to Nome and finally to Kotzebue. The expedition consisted of six American and six Soviet participants, who travelled about 950 miles through Eastern Siberia to Alaska over the frozen Bering Sea. The weather was poor for much of the time, with almost continuous snow storms and temperatures around -15 to -20°C.

Radio communication for the expedition was handled by Soviet amateurs using the special base-camp expedition calls EK0AH, EK0KP, and EK0APH. This report (which I received from NZ9E) is based on information received from EK0AH, Andy Fyodorov, whose

home call is RW3AH.

Communications to the base camp were handled by EK0GZ (Alex, UW3GZ), who was part of the ski/dog sled moving group. Of great help to the expedition from the US side were Hal, KL7HJD, Anchorage, and Chuck, KL7DTH, on Little Diomedes Is. Other Soviet amateurs who provided support included UA0KC, UZ0KWJ, UA0KAP, UZ0KWO, UA0KBB, UA0KBL, UA0KBM, and UA0KAH, as well as many others to whom the expedition is grateful.

EK0AH made nearly 9000 QSOs during the expedition, including 65 using the callsign KL7/RW3AH while on US soil. At the conclusion of the adventure the group was congratulated on its success by both President Bush and Mr Gorbachev. Please send all QSLs for EK0AH and other participating USSR stations to Box 88, Moscow - however, cards for KL7/RW3AH may be sent to the address in QTH Corner.

EGYPT

A letter from the Egypt Amateur Radio Sport (the national society in Egypt) reads as follows: "Some pirate stations have used unofficial SU calls against the amateur spirit as they are located on the borders and some have collected false papers and sent them to the DXCC Manager. Only the list attached are officially licensed, no more. There are no calls /SU. Please check with ARENTO, c/o Int. Telecomm. Sector, PO Box 795, Cairo Egypt, or with Ahmed Hassan Ahmed, SU1AH, secretary of EARS (PO Box 73, Heliopolis, 11341 Cairo). Example of some pirate stations - PA3AUX, SU1EK, SU1EE, and all with /SU. ARENTO will be re-printing the amateur licence this year. Please - your assistance is

appreciated. The list of legitimate stations includes: SU1s AA, AB, AC, AH, AL, BA, CR, DZ, ER, FN, HK, HT, IM, KZ, MI, MK, MR, NK, RR, SR, UN and SU2TA."

THIRTY YEARS OF THE SP DX CLUB

This year Polish DXers celebrate the 30th anniversary of their club. A Convention will take place in Krakow on 7-8 October and foreign visitors are welcome. The loan of video films and other materials pertaining to amateur radio would be welcomed and these will be returned after the event. A special station, SQ0DXC, will be on the air from 2 to 8 October. Krakow offers many attractions and intending visitors should contact Henryk Zwoiski, SP9JPA, PO Box 606, Krakow 1, Poland.

PROPAGATION

Smithy's last-minute forecast reads as follows: "The pause in the advance of Cycle 22 came to an abrupt end in the first weeks of June when the 2800MHz solar flux began to climb steeply, reaching 327 SFU on June 15th - the highest so far in this cycle. In the last week of the month the 27-day average was still climbing and was close to the January peak of 242 SFU. In fact, when account is taken of the distance between Earth and Sun which is at a maximum in June, the true value has already passed that peak and it is likely that the monthly averages of solar flux and sunspot numbers will prove to be the highest of the cycle so far. "HF band conditions were at their best in the period after the high peak, with even 28MHz offering somewhat unusual summer DX including VKs on the (AM) short path and ZL4 on the (PM) long path.

VHF/UHF

NORMAN FITCH G3FPK

My recorded data for 144MHz Sporadic E openings from 1977 to 1988 indicate a 22% chance of one occurring during the first nine days in June. This year (just to keep us on our toes) things were very quiet until the 10th, when it all happened - auroral Es, a long aurora and an extensive Es event which continued well past midnight GMT. There were other major Es openings on the 12th and 17th, and a short one on the 13th. On the 24th, the first 50MHz QSOs this solar cycle with W7 - Washington state - were made from southwest England.

BEACONS

From Eddi Ramm, DK3UZ, and PA3AEF via John Hunter, G3IMV, I have received details of the Dutch beacons in the 144, 432, 1296 and 2320MHz bands. They are listed in the table shown on next page.

DXPEDITIONS

Reminders that the Derbyshire Hills Contest Group should be QRV from the Outer Hebrides from 6 to 18 August and that GW0KZG/MM should be operating from the North Sea until 4 August - see last month's DXpedition notes. GM4AFF should be QRV from Foula (IP80) from 9 to 14 August, as detailed in the June report. Alan Harper, GM1SZF (HLD) wrote that the report in "6m and Up" that OY9JD will be QRV from IP61 square in August is incorrect. John may be active from home and from the club station in IP62, though.

50MHz

This fascinating band is forever posing propagation puzzles - such as the non-Great Circle beam headings regularly reported. Now the plot thickens. Roger Gordon, G1ENJ (SXW) was monitoring 50.110MHz at 0225GMT on 10 June. The band was quite active and he heard G8THK (LDN) calling CQ. When he finished, his pip tone was echoed back. Roger then called CQ himself and, when he went over to listen, he heard the last two letters of his call. They repeated this experiment several times but the phenomenon did not reappear.

Have others observed this on 50MHz? Roger refers to a 'worldwide echo' but did not indicate whether it was the approximately 140 millisecond delay sometimes noted on the HF bands, particularly 21MHz. In any case, such conditions usually prevail for some time on the HF bands - but this was a very fleeting



Melish Reef, showing (l to r) the operating tent, generators, antenna and accommodation tent amidst a flurry of bird life.

LIST OF BEACONS IN THE NETHERLANDS 144MHz - 232GHz							
Call	E-QTHL	QRG MHz	Po(W)	Antenna gain dir.	Metres AGL/ASL	Keeper	Notes
PI7PRO	CM35c	144-840	10	3dB Omni		PI4VRZ	
PI7CIS	CM72A	144-935	50	6dB	8/18	PA0CIS	
PI7ZWL	DM31e	144-870	1-5	0dB Omni	30/30	PA2SDL	
PI6SHF	CM56f	432-637	1	6dB S	150/150	PA0PLY	1
PI6UHF	CL09b	432-675	1	Omni	30/50	PE1DCY	2
PI7QHN	CM53b	432-905	1	3dB Omni	20/20	PA0QHN	
PI6ASD	CM55g	1296-642	1	Omni	30/30	PA0AWP	3
PI7DIJ	DN71a	1296-816	1	5-5dB Omni	15/15	PA3DIJ	
PI7QHN	CM53b	1296-917	4	6dB Omni	20/20	PA0QHN	
PI7IVA	CM79f	1296-940	1	8dB Omni	15/30	PE1IVA	
PI7GHG	CL03c	2320-857	4	20dB SE	49/49	PE1GHG	
PI7TGA	CL20a	2320-873	1	10dB NW	50/75	PA0TGA	
PA0QHN	CM53b	2320-921	0-2	6dB Omni	20/20	PA0QHN	

Notes: 1. Transponder (2320-33 to 432-62MHz) beacon.
2. Transponder beacon. (Transponder not yet operational).
3. Transponder (432-55 to 1296-63MHz) beacon.

event. G1ENJ did not mention the strength of the echo he heard from G8THK, compared to the direct signal. Your comments please.

Ray Cracknell, G2AHU (HWR) has sent Report No. 5 by the 50MHz Reporting Club covering the period 1 September 1988 to 28 February 1989. It includes graphs of the smoothed sunspot numbers from 1978 to date and of the monthly mean SSNs for Cycle 22 so far. The NOAA in Boulder, USA, is now predicting the peak in February 1990 with 195 ± 46 for a 90% confidence level. The report includes reports from Britain and results from JA, ZD8, SV, 9H, VS6 and SM.

There's a reference to the "Prophop" computer program produced by Dr Clive Smith, G4FZH, which calculates distances, bearings and hop parameters. It is available on 5.25" floppy disc formatted under MS-DOS 3.2 and was written in BASIC on an IBM-compatible XT clone. For details, send an SASE to G4FZH at Grey Gables, Humfrey Gate, Taddington, Buxton, Derbys SK17 9TS.

A further report includes reception analyses of numerous 28MHz beacons from England by

G2AHU and G3USF, and from South Africa by ZS6PW for May. A list of DX worked from Japan throughout April, reprinted from the June issue of *Five Nine* magazine, makes fascinating reading; all those exotic, Pacific prefixes like FK, FO, KC6, T2, T3, ZK and 5W...

As so often happens, significant events occur just after the deadline dates. This month it was the first opening to western USA on 24 June, details of which were telephoned to me by Devonshire members Dave Gregory, G8JDX, and Ted Collins, G4UPS. The 28MHz band was pretty dead around 1400, following a fadeout earlier, with no DX beacons audible. K7KV (DN16) in Washington state worked into CT1; then at 1401 he contacted G3ZYY (CNL) on CW for the first UK-W7 QSO of Cycle 22. Further QSOs were on SSB with G8JDX at 1427, G6ION (CNL) at 1428, G7BXS at 1429 and G4UPS at 1432.

Ted worked W1AMG at 1422 and nine other W1s, but all were weaker than the K7. The event was over by 1505. He thinks it was double-hop F2 mode to W7, but that is unlikely to be verifiable as the first hop would land in Baffin Island - not

what you might call a hive of 50MHz activity! Initial beam headings were some way south of the Great Circle ones, which are 287° to W1 and 319° to Washington. The respective QRBs are 5000 and 7500km in round figures. The solar flux was 219 that day and 'Miniprop' suggests an FMUF of a mere 21.5MHz for the W7 path. Weird...

Now the general reports, starting with Colin Shepherd, G0COL (YSN) who runs 25W to a 3-element home-made Yagi. He worked SV1OE (KM17VX) at 0024 on 11 June, at the end of the very extensive Es opening and - like many others - was surprised how late the band remained open. However, with intense ionization and the short hours of darkness at midsummer, the E-layer sometimes supports propagation on the lower VHF's throughout the night.

Mike Gotch, G0IMG (ESX) notes three new countries - OH2BOZ/OHOM (Market Reef), T77C (San Marino) and FC1EAN/7X in Algeria. The OH0 was also new for Gerry Schoof, G1SWH (LNH) on 12 June, other new countries being LA8OW and OH5NQ on the 8th. ZB2/GOLFF on the 17th and GJ7DGJ on the 18th. In the Es opening on 10 June John Heys, G3BDQ, (SXE) worked GM3XOQ (SLD) and several LAs. A weak SSB signal on 50.110MHz around 1820 was identified as an HC station giving his QTH in Spanish as PO Box DX, Cuenca; he then called an OH. John worked OH3OZ and OH2SX on CW and - at 1915 - OH2BOZ/OHOM on SSB.

Alan Harrison, G1NRM (LDN) telexed his report to my mailbox. His June QSOs included ZS6WB at 1400 on the 4th; 9H5EE and 9H1GP around 1600 on the 5th; CT1AUW at 1254 and PA3FBN at 1328 while beaming south on the 6th; on the 10th, 15 stations in the aurora between 1522 and 1754 (including five GMs and two GIs) and SV1OE at 2209 in the Es; CT1WB at 0920, ZB2/GOLFF/P at 1007 and five LAs and three OHs between 1720 and 1915 on the 11th and FC1EAN/7X at 1939 on the 13th.

G3IMV (BKS) never thought he would be interested in the band but got going on 12 June using a Kenwood TS-780 with a Microwave Modules transverter giving 18W. His antenna is a wire dipole running NW/SE. In the first week John had worked 14 countries in 37 squares, including G4VXE/CT3, OH0M, T77, ZB2 and 7X. While on holiday in the Isle of Wight at the beginning of June, Tim Stanley, G4DBL (HPH) worked the CT3 dxpedition at 1615 on the 8th. He used a Yaesu FT-690 and PA running 7W from NiCad batteries; the skyhook was a 2-

element beam on a 10ft pole and Tim was perched on a cliff path above St Catherine's Point. Prior to that he contacted 9H3KD.

Paul Kerslake, G4NDG (DVN) confirms that when he worked CX4HS on 24 April, it was on the Great Circle heading; however, he first heard him at 1705 at QTE 250-260 degrees. On 3 June he worked G4VXE/CT3 at 1448 and CX8BE at 1818, followed by LUs 3DCA, 6DLB, 1DMA and 7DZ plus many more heard and all in GF05. At 1920, CX8BE called Paul and was up to S9 until about 1945. Lots of Es stations were heard on 5 June, with backscatter PAs and Es 9BG and 5FK on the 6th. ZS3VHF was copied on the 5th, 7th and 8th. Paul has heard all continents in under a year.

John Palfrey, G4XEN (NHM) visited EA7AG (IM85) during early May. Andres lives in Almeria and John heard TEP signals from ZS3 at 1900. The GB3NHQ beacon was a weak and watery signal. The local TV is on UHF and Andres hopes to apply for a one-off TX permit but doubts whether he will get one. He confirmed that no Spanish amateurs are allowed to transmit on 50MHz. EA1MO doesn't seem to want to know that, though...

In the 10 June aurora Ela Martyr, G6HKM (ESX) worked GM4WTA (GRN) and G8AYZ (ATM), and the next day OH7AI (KP33) for a new square. On the 12th GJ0KKB was worked, then CT1WB (IN51), FC1MDT (JN23), OH2BOZ/OHOM (JP90), GM1SMI/7X (IO89), GM0ILB (IP90) and OH7NFE (KP42) - which were all new squares. At 1630 on the 15th she worked the -/7X (JM36). The 16th brought contacts with FC1MKY (JN33), the ZB2 (IM76), SMs 6AEK (JO66), 0MXR (JO89) and 0HP (JO99), plus OH9NLO (KP26) for more new squares. In the contest on the 18th, PWS, CWD, NOT and YSN were new 1989 counties for the table.

Paul Thompson, G6MEN (SPE) sent in a four-page report for the period 12-17 June which included very detailed reception reports of the ZB2VHF and CT0WW beacons. QSOs in this period included OH1YF (KP10), LA9DI (JO59), OH2BOZ/OHOM, FC1EYB, FC1BL and FC1BNB (JN23), FC1AUB (JN13), FC1EAN/7X, FC1MKY and F5GZ (JN33), ZB2/GOLFF, F2BJ, FC1EOT and FC1GXV (IN94), FD1FLN and FC1HRF (IN95), FD1EMT (JN15) and T77C on CW. On 28MHz, T77C stated categorically that he is genuine and is not limited to the bottom 3kHz of the band - but see later notes from G4UPS.

Dave Storrs, G8GXP (YSW) worked T77 and SV during the Es

ANNUAL VHF/UHF TABLE
January to December 1989

	50MHz		70MHz		144MHz		430MHz		1-3GHz		Total
Call	Cty	Tr	Cty	Tr	Cty	Tr	Cty	Tr	Cty	Tr	Points
G1SWH	58	21	41	5	88	19	44	6	—	—	282
G6HKM	59	24	—	—	64	27	35	12	15	7	243
G8LHT	37	13	19	4	70	22	31	10	2	1	209
G0IMG	62	21	26	4	49	10	23	4	—	—	199
G4XEN	24	9	17	2	71	21	35	9	—	—	188
G1DOX	26	3	33	6	57	13	20	3	2	1	164
G4PIQ	—	—	—	—	78	28	36	15	—	—	157
GM1SZF	41	11	—	—	71	16	7	6	—	—	152
G8PYP	28	16	—	—	47	24	18	9	—	—	142
GM4CXP	28	11	4	1	60	19	4	3	—	—	129
G3FPK	—	—	—	—	69	23	—	—	—	—	92
GW4FRX	—	—	—	—	55	32	—	—	—	—	87
GJ6TMM	28	12	—	—	23	9	1	4	—	—	77
G4OUT	—	—	18	2	37	18	—	—	—	—	75
G7CLY	—	—	—	—	54	14	4	1	—	—	73
G4TGK	—	—	—	—	44	14	—	—	—	—	58
GMOJOL	—	—	—	—	31	11	—	—	—	—	42

Do not include EI counties. British counties are the 79 listed in the January *RadCom*. Up to three different stations allowed in all 12 GM regions. Countries are the usual DXCC ones.

event on 10/11 June and said that the band was open all day to OH on the 11th, including the Market Reef station. G8JDX also worked the latter and, on 3 June, CX8BE. Ian Harwood, G8LHT (YSS) replaced his HB9CV antenna with a 5-element Tonna Yagi and estimates it to have 4-5dB more gain and a much cleaner pattern. With 5W and the HB9CV he worked eleven countries. Steve Damon, G8PYP (DOR) lists Es QSOs with OH and F on 5 June, CT1AUW on the 6th, OH on the 7th, LA and OH on the 11th, GM6RGN and GM3XOQ (SLD) and LA on the 12th, SM0HP on the 16th and F and ZB2 on the 17th. He contacted G18AYZ via aurora on 10 June and GJ7DGP/P on tropo on the 18th.

Geoff Brown, GJ4ICD, included some news items among his extensive list of QSOs from Jersey. SM6PU told him that the SMs can operate on Sunday mornings before TV starts at 1200GMT. 9H1CG heard an N4 around 2220 on 4 June and wondered, "...is this the first report of Es across the pond?" G4VXE/CT3 was audible from 1404 to 1633 on 6 June and put out many CQs but was unable to reach the UK, even though he was S9 plus 20dB in GJ at 1600. At 1300 on 10 June, beaming 220 degrees, Geoff heard auroral TV sound on 53.757MHz - but not when beaming north. This was also observed by G3JVL, but at 1340 normal auroral reflections were heard from the north. On the 11th there was Es propagation in all directions from CT to OH9, and GJ4ICD is claiming the first GJ/Market Reef QSO at 1742. An interesting QSO on the 14th was with GW8VHI/MM (JO65) when Reg was travelling between OZ and SM.

GM1SZF uses a Yaesu FT-290R, RN Transverter at 25W and a 3-element MET Yagi at 53ft fed with Westflex 103 cable. On 5 June he worked GM1SMI/P (IO89), then LAs and OHs in the late evening of the 9th, 26 stations in G, GI, GM and PA in the aurora on the 10th, and GJ4ICD on the 15th. John will be on holiday from 10-16 August, so anyone wanting a sked with IO88 can telephone him on 0955 5879. He would welcome skeds with stations in IO70, 71 and 72, IN field and with any EIs.

Pete Weller, GM3XOQ (IO99IX) has been QRV with 10W to a dipole at 40ft since 1 June. Between 1410 and 1648 on the 10th he worked G, LA, OH, PA and SM stations in the aurora, and OH5NQ on SSB at 2230 via auroral Es. The 11th brought "end stopping" Es signals from PA and next day he contacted TV6GLE (IN87AR) on Glenan Island, off

Call sign	50MHz	144MHz	430MHz	1-3GHz	Total
G3IMV	38	416	124	48	626
G4KUX	—	384	120	—	504
G3IJE	207	338	—	—	545
G4SWX	—	323	—	—	323
G0CUZ	—	309	—	—	309
G4RGK	—	284	126	51	461
G4RRA	—	275	80	—	355
G4XEN	66	274	111	—	451
GJ4ICD	205	256	119	59	639
G4SSO	—	239	70	—	309
G3FPK	—	238	—	—	238
G4PIQ	—	229	78	—	307
GW4FRX	—	224	—	—	224
G6HKM	86	207	107	45	445
G4DOL	—	202	—	—	202
GM4CXP	—	198	31	—	229
G6DER	38	183	112	79	412
G8LHT	52	161	84	6	303
G0LFF	83	153	—	—	236
GJ6TMM	62	151	47	—	260
G4XBF	—	146	—	—	146
G8ATK	—	143	94	52	289
G4TGK	—	136	—	—	136
G1WPF	—	101	—	—	101
G8PYP	47	95	19	—	161
G1DOX	33	61	11	3	108
G7CLY	—	38	1	—	39
G6MEN	48	—	—	—	48

southern Finisterre. He worked 95 stations in G, GJ and PA in tremendous pile-ups in the "massive Es opening" on the 12th.

Derrick Dance, GM4CXP, (BDS) uses a Yaesu FT-101B, MM transverter and 5-element Tonna Yagi at 23ft, giving 100W ERP. He uses CW and SSB. He was QRV in the 10 June aurora from 1320 till 2000 and worked G, GD, GW and PA stations. Peter Halpin, PE1MHO/G7ECN, reports a QSO with LU9AEA at 1853 on 18 May using 2.75W of SSB. His report was RS52 at best. His station was an Icom IC-202 and PW Meon Transverter with a VN66AF PA stage, but he did not mention the antenna. He calculates 2,626.6 miles per watt and wrote, "Let the QRO boys eat that!"

G4UPS's correspondence only just arrived in the nick of time and included a complete list from F9LT of all French 50MHz permit holders giving call, name, power, department number and name. Apparently no further French permits are likely to be issued for quite a while. Note that "regulars" F5GZ, F5LT, F6BW, F6DRO and F6FEF are NOT in this official list prepared by the REF. On the pirate theme, Ted says that Tony - T77C, and the genuine article - reaffirmed that the only San Marino licensees are T70A, T77C and T77F and these are restricted to CW - so best not to work any T77 who uses SSB. The T77C widely worked on SSB is believed to be an Italian amateur. Further silly call signs on the band are OZ50MHZ and YU50MHZ, the latter according to normally impeccable sources being the Head Honcho of the Yugoslavian

equivalent of the RISI! There are no 5B4s with permits so there is no point in joining pile-ups to work them - they won't be accepted for any awards, or points in our tables either.

By now, S01A (IL56F1) may be QRV from the Saharan Democratic Republic - another new country - using a Kenwood TS-680. FR5DN has finally received the 50MHz module for his FT-726 and hopes to have his permit soon. QSL to Mr P Mondon, CD16, Avirons 97425, Reunion Island. ZD8BOB and ZD8RP are looking for equipment so they can get going on the band.

Ted's activity list ran to six pages and he included many tropo QSOs to illustrate that this mode is worthy of more serious exploitation. He worked most of the available Es and auroral DX in June including G4VXE/CT3 on the 3rd, FC1EAN/7X on the 13th, ZB2IW (IM76) on the 16th, ZB2BL on the 20th. All these plus I4BXN (JN54TN) on CW at 2151, who is a very well known 144MHz operator but apparently "self licensed" on this band!

70MHz

G1SWH's new counties for the table in June were G1SNK (NOT) on the 3rd, G14SZU/A (ATM), GM0EWS (HLD) and GM1SMI/P (OKE) on the 10th and GM4CXP (BDS) on the 17th. In the 10 June aurora, Ian Cornes, G4OUT (SFD) worked G4ENA (GLR) on CW. GM4CXP is now QRV again. Derrick uses his FT-101B driving a Magnum 2 transverter converted to 70MHz and runs 60W of SSB and 40W of CW. The antenna is a home-made 5-element Yagi at 26ft and he is looking for QSOs. As usual, with

the rival attractions of 50 and 144MHz, reports on this band are sparse.

144MHz

Untrue to form, there were no major Es openings in the first week of June. However, a solar storm on the 8th triggered off a significant aurora on the 10th, when the A index reached 42 and the solar flux 266 units. John Eden, GM0EXN, (HLD) telephoned to say that auroral signals were building up and the first ones at G3FPK were heard just after 1300GMT.

G0COL found "...the usual LAs, SMs, DLs and GMs..." Colin Morris, G0CUZ (WMD) logged the event from 1310 to 1830, best DX being UQ2GMD (KO17), SP5EFO (KO02), SP6GZZ (JO81) and OK1KRU/P (JN79). G4OUT heard SP6GZZ at 1615 and worked EI, G, ON and PA stations on CW. From G3FPK the signals peaked up around 20-30° for the 'locals' and at 40° for the Scandinavians.

John Regnault, G4SWX (SFK) heard DLs calling CQ OH at 1240. At 1242 he heard a vast pile of DLs, ONs and PAs calling SK3LH (JP93IH) and he finally got through at 1255. Reports exchanged were 559/569, almost certainly via auroral Es mode, and he was still T9 at 1355. The aurora started just after 1305 with GMs, SM5, SM7 and GM1SMI/P. Best DX was worked from 1402 and included OH5LK (KP30), OH2BAP and OH3EX (KP20), plus another 25-30 assorted Scandinavians. UR2RJ (KO29) was contacted at 1448 after which "...family hassles..." dictated QRT for a while! From 1655 till 1825, best DX were RB5PA (KO21) and UC2ICU (KO13) for a new square. John worked about 100 stations in the event.

G6HKM called CQ and had about 40 SSB QSOs, best DX being SM1PDA (JO97), SM6KKX (JO67) and SM7FMX (JO65). G8PYP worked G14KIS (IO64) and G1JXX (IO95) around 1420 in what Steve thought "...a half decent aurora." GJ4ICD worked GM0EWS (IO67) for a new square. GM1SZF logged the event from 1230 to 1715 and Alan's tally was 20 DLs, 16 Gs, two GIs and ONs, five PAs, two Ys, including Y45ZH (JO51) for a new square, and one each EI, GW and OZ. GM4CXP worked all the usual countries plus F, HB9, OK and SP.

John Nelson, GW4FRX (PWS) found three new Russian squares - UQ2GMD, UP2BH (KO25) and RB5PA, together with LA3NGA in the rarish JO49. Of the 34 SPs worked, none was in a new square nor stronger than S4A. QTE for Scandinavia and eastern Europe

was 30 degrees, with hordes of ONs, PAs and DLs at 40 degrees. The event ended abruptly at 1828, the last station worked being F1FHL (IN97).

Now the June Es events. G0CUZ heard YU2SB briefly at 1730 on the 5th, but the first major opening began at 2058 on the 10th. Up to 2210 he worked YUs in seven squares, then IK3MLF and I3MTM (JN55) at 2345, the session fading out at 0015. On the 11th he had a scratchy QSO at 1222 with EA7AJ and heard EA7DZL. Between 1224 and 1315 on the 12th he worked some Italians in the Rome and Naples areas plus I8TUS (JM89) and IK7MCJ (JN80), both new. The 1700-1900 opening was a non-event in Dudley and only UO5OB was heard on CW. On the 13th, EA7GKF (IM87) and EB7BQI (IM76) were contacted around 1220. On the 16th he worked IW0BTS (JN61) at 1006 and heard EA7DZL again at 1302. Between 2100 and 2132 on the 10th, G0COL worked some Is and YUs. More Is were worked between 2215 and 2345, and in all Colin ended up with 14 Is and three YUs. G3IMV found three new squares in the 17 June event - YT5G (KN11), YO3BTC/7 (KN25) and LZ1s KCP and KSP (KN21). The list from Simon Freeman, G3LQR (SFK) for 12 June was passed on via G4SWX. From 1220 to 1311 Simon worked 17 Italians in the 0, 4 and 8 areas plus a couple of IT9s.

Peter Atkins, G4DOL (DOR) contacted 20 different stations on 10 June between 2051 and 2214 - two HGs, one LZ, five OEs, eight YOs and four YUs in ten squares. The 12th brought 9H1GB (JM75) at 1627, but the big day was the 17th when he made 46 QSOs with 26 squares between 1642 and 2050. Best DX were UO5OB (KN45) at 1644 and IS0IGD (JM49) at 2047. Gotaways were SV2RM and TK5EP and Peter reckons he was just on the edge of it. G4OUT worked LZ1s KDP and RB, YUs 1AFS and 2CBE and HG8UN (JN96) on CW between 1836 and 1906 on the 17th. Alan McMillan, G4SSO (LDN) worked YO9AZD (KN24) at 1717 and LZ1ZX (KN32) at 1733 on 12 June.

From 2055 to 2210 on 10 June G4SWX made 34 QSOs, mostly with LZs and YUs, plus the occasional OE8 and IW3; John missed the second half of the match. He missed the lunchtime opening on the 12th too but was QRV from 1655 to 1922. He lists QSOs with LZs, UYSHF (KN86) at 1845, UO5OX (KN46) at 1847, YO5BWD (KN27) at 1907, UO5OB at 1912, YO5DJM (KN17) at 1913 and YO4BZC (KN45) at 1922. The 17 June event between 1600 and 2027 resulted in

71 QSOs. Countries worked were HG, I, IS0, LZ, YO and YU, with best DX SV2NE at 1900 and SV2ABQ at 1909 - both in KN10.

John Wimble, G4TGK (KNT) operated in the 10 June event when YU7AS (KN05) was a new square. The 17th brought IK8AOT (JN71), YU1CF (KN03), YU1EV (KN04), LZ2KRU (KN33) and YO5KNY (KN36) for more new ones. Mark Holloway, G4YRY (DOR) worked EA7DZL at 1230 on 11 June and YO3CTW at 1728 on the 12th. From 1627 on the 17th he did very well, making 55 contacts with many HGs, LZs, YOs and YUs. Best DX were RB5CO at 1806 and UP4EWA at 1810. In the mid-evening he found OE, 9H, I7, I8 and IS0 stations and, at 2158, EB7NK. Mark uses an FT-290, 80W amplifier and two 14-element Yagis, his QTH being at sea level. Using 50W of FM and a colinear antenna, P. Zasadzinski, G4ZWP, (HFD) worked I6JLO on 12 June at 1300.

G6HKM worked six Italians on 12 June, notching up her 200th square, IK0FEC (JN63). She has a TR-9130 with halo antenna in the house and can monitor 144.300MHz all day, so on the 17th she was in on the Es from the start. A CQ call brought five LZs, two HGs, five YOs and 13 YUs. Later, IS0 was an all-time new country. In the midday opening on 12 June, G8LHT worked into I0, I6 and I8, IT9 and 9H.

G8PYP operated from 2052 to 2203 on the 10th, working into HG, OE, YO and YU. He reckons the footprint of the opening on the 17th extended from Germany to Wales, but with relatively low signal levels. 50MHz produced nothing spectacular; there were no Band 2 FM signals nor any Band 1 TV of any note. Steve says the event was going nicely on 144MHz for a good half-hour before any of the local DX-chasers noticed it! He suggests propagation was partly tropo which would account for some of the longer than usual distances worked.

GM4CXP was amazed to work Italians at colossal strengths at 2330 on the 10th. Derrick had QSOs with stations in JN45, 52 and 61. GW4FRX discovered the 17 June Es at 1640, working YOs 3RG, 9AFY and 3ACK all in KN34 and only S4. Very weak LZs were heard at 1815 and John finally broke his Bulgarian jinx with LZ1KCP (KN21) and LZ1KDP (KN12) on CW. At 1930 the opening moved to Italy with I7LPW (JN81), then to IT9 at 2017. TK5EP was heard but was too weak to work. 9H1CD was S9 at 2021 but the loudest signals in the whole opening were IS0s QDV and OZK (JM49).

Eddi Ramm, DK3UZ (JO43)

worked LZ1KJ at 1759 on 5 June and heard TA3C (KM38). In the evening opening on the 10th he contacted eight Is in the 0, 1 and 5 call areas between 2100 and 2121. Between 1151 and 1312 on the 12th he had QSOs with five 9Hs, three IS0s, IT9NDW (JM68) and IW0UIM (JN40) and at 1846 with RB5FF (KN45). UA3MBJ (KO88) was a nice SSB contact at 1724 on the 15th. Eddi's last report covered the big event on the 17th during which he worked I, YU and LZ plus SV1EN (KM18) at 1725 - a QRB of 2,046km.

Now to other modes. G0CUZ contacted Gerry Goldsmith, G4CJG/MM at the start of his voyage to Brazil. On 15 June he worked him in IO61, the next day in IO60, IN58 and IN57. Colin completed MS QSOs with OK5UHF (JN98) on the 3rd and Y22IC (JO63) on the 9th. John Lincoln, GM0JOL (HLD) raised OY9JD (IP61) on tropo through the OY3REA repeater, then they QSYed to direct SSB. OY9JD could only work John by beaming north, reflecting his signal off the hills. The same day, GM1SZF worked OY6FRA.

Andy, GM4IPK (IO99) had got his heavy-duty tower installed by press-time although he was having trouble with the head unit. He's obtained some LDF-5 Heliax and will be using a single 15-element Cue Dee while the stacking frame

for the four-wide array is fabricated. Andy is QRV on 50 and 430 MHz and was popular on the latter band with half the population of PA and ON during June.

430MHz

G1SWH worked GM4CXP on four bands on 17 June, including 430MHz, but Gerry did not list any other notable QSOs in the month. Andy Cook, G4PIQ, (SFK) telexed his report and says he has been QRV since August last year using 15W and a single 21-element Yagi. His 78 squares with this modest station is quite good. GM1SZF uses an FT-726R with 8W to a 21-element Tonna Yagi at 46ft. He plans to buy two antennas, add elevation and increase the power to about 100W soon. Alan's June QSOs included GM1SMI/P on the 5th, PAs in JO21, 22, 23, 32 and 33 and DC2BC (JO33) on the 15th, all new squares; GM4IPK (SLD) on the 17th, DJ9BV (JO43), LA1ZE (JO28) and G1WWO (TWR) on the 18th and DH5BAG (JO43) on the 20th at 0419. GM4CXP has 10W from an FT-101B and MM transverter combination, the antenna being a 46-element Multibeam at 32ft.

1.3GHz

G4NDG finds little activity, apart from contests, even though the GB3MHL beacon was audible in

DERBY & DISTRICT ARS ANNUAL NATIONAL 2M CONTEST RESULTS

Sunday 12th March 1989

Posn.	Call sign	County	Single or multi - op	Adjudicated score
Section 1 - Full Legal Power Limit				
1	G0FEH/P	DERBYS	M	17376
2	G1EUU/P	LEICS	S	12870
3	GW4VX/P	MID GLAM	M	9676
4	G6HKM	ESSEX	S	7878
5	G4XEN	NORTHANTS	S	7566
6	G1EMJ	W MID	S	4488
7	G8IUB	W MID	M	1620
8	G6HYP	LINCS	S	1088
9	G1VKT	GTR MAN	S	924
Section 2 - Low Power - 30 Watts Maximum Output				
1	G4RLF/P	WILTS	M	11088
2	G7APD/P	NORTHANTS	M	10584
3	G4ARI	LEICS	S	10530
4	G3VRE/P	WILTS	M	10286
5	G0GGG/P	WILTS	M	9156
6	G1POD/P	W SUSSEX	M	7722
7	G7AFM/P	SALOP	S	5220
8	G0EVD	HERTS	S	3600
9	G0DVE/P	DORSET	S	2584
10	G1LRS	SURREY	S	2350
11	G2CIV	DERBYS	S	1496
12	G0BWB	W YORKS	S	1428
13	G4SLH	ESSEX	M	1376
14	G1UET/P	GLOS	S	1280
15	G1WAB	DERBYS	M	1184
16	G8LED	NORTHANTS	M	1012
17	G1BHE	LEICS	S	812
18	G3VGW	LEICS	S	298
Section 3 - SWL				
1	D GILBERT	SURREY	S	288

Checklogs gratefully received from G0CLP, G2FWX and PE1EWR. An entry from G6IEK/P was received after the closing date and treated as a check log. Certificates are awarded to G0FEH/P (section 1 Winner), G1EUU/P (section 1 runner-up and leading single operator), G4RLF/P (section 2 Winner), G7APD/P (section 2 runner-up), G4ARI (section 2 leading single operator) and D GILBERT (section 3 Winner).

Devon on most mornings in the hot weather. On 16 June in the evening, the band came to life at G6HKM enabling Ela to work PA3DJJ, DL5BAW, PA3CEG, PE1NBC, DC4BK and PA0TMP - best DX being to JO43. GM4CXP's activity is currently limited to receiving with his FT-101B and MM converter. Derrick uses a home made 14-element quad-loop Yagi.

CONTESTS

The Derby and District ARS has sent the results of its 144MHz contest held on 12 March. In Section 1, Full Legal Power, the clear winner was G0FEH/P (DYS) with 17,376 points. G1EUU/P (LEC) was runner-up with 12,870 and GW4VXX/P (GNM) came third with 9676 points. There were nine entries. Section 2 was the Low Power part, 30W maximum output, which attracted 18 entries. The winner was G4RLF/P (WLT) with 11,088 points and in second place was G7APD/P (NHM) with 10,584 points. G4ARI (LEC) came a close third with 10,530 points. D Gilbert (SRY) was the only entrant in the SWL section with 288 points. The Barking Radio and Electronics Society's 144MHz Contest is on 13 August, 1300-1700GMT. The rules are the same as last year. There are two sections, Full Legal Limit and Low Power (20W PEP output). The exchanges are to comprise callsign, report and serial number and administrative county for British stations. Continentals should give their locator. Each contact counts one point, but try to work G3XBF or G8XBF - they're worth ten points each. "Multiplier will be the number of counties plus overseas locator scores. Final total to be points times multipliers." Entries, postmarked no later than 28 August, should be sent to BRS31976, 32 Wellington Road, Rayleigh, Essex, SS6 8EZ.

DX WINDOW

Bill Tynan, W3XO, devotes over half his "The World Above 50MHz" column in the July issue of QST to the 50MHz DX Window controversy. The aim is to agree a plan whereby operators in continental USA and southern Canada use one portion of the band only for working stations outside North America. The RSGB Band Plan designates 50.100-50.125MHz as the intercontinental DX window, and 50.110MHz as the intercontinental DX calling frequency.

There are five proposals in QST for the DX window. They range from the RSGB plan, through 50.100-50.120, 50.100-50.150, 50.080-50.100 (for CW only by US licensees) to 50.200-50.250MHz.

Proposals are for a calling frequency of 50.110 as at present, or 50.120, 50.125 or 50.150MHz. Bill wanted votes in by 20 July, which left no time for any overseas input. He hopes to publish the results of the poll in the October QST. His QTH is HCR 5, PO Box 574-334, Tierra Linda Ranch, Kerrville, TX 78028, U.S.A. His telephone number from the UK is: 0101 512 257 1296. Your comments on the need for a re-think would be welcome.

DEADLINES

Please note the following deadlines: for October, 25 August - a day earlier than stated last issue - and for November, 22 September. These really are cast iron dates and I cannot guarantee to include items received later. My E-mail mailbox number is 76:MSX022 and the telex number is 9312132268 (SAG). I clear the mailbox every day.

SWL

BOB TREACHER BRS32525

It's always the way - after last month, when there was hardly anything to report, I have an enormous amount to relate this time! We'll start with the HF bands. First, a report from Geoff, G0GGR, who sent in a lot of detail about activity on RTTY - a mode we've hardly ever covered here in the past. Geoff's view is that there are now more DX stations than ever active on RTTY. He provided a long list which included CP6KM, DU1ANG, HZ1AB, FM5FA, FY5DG, PJ2MI, SU1EE, V85GA, Y11BGD, 3X1SG and 5N0ALE. I'll be pleased to devote some more attention to RTTY if readers would like to send in more reports.

Stations in France and the French colonies abroad are able to use the figures '89' in their prefixes on certain days of the year. This is to celebrate the bicentenary of the French Revolution. The allotted dates in August are the 4th and 26th. As a guide, you might expect to hear the following:

France - FE6AJA could use F89/FE6AJA

Corsica - TK5IU could use TK89IU

Gadeloupe - FG4AA could use FG89AA

Good luck, and do let me know how many of these special callsigns you hear.

John, G4QK, wrote with reminiscences about his days as an SWL some 50 years ago. His collection of QSL cards - all for 14MHz CW, and all obtained with an Q-V-1 receiver - includes KA (DU), OQ5, VQ2, OA, PY, VK, ZB2, ZL and ZS. John still does a lot of

listening and adds that the best SWL card he has received came from BERS195 (Eric Trebilcock) on his 7MHz CW signals in 1951. As for the worst, John said that there were too many to list... ouch.

Nice to hear for the first time from Joe Hyde, RS44311, who provided a list of the DX he heard on 21MHz in mid-May. In just over an hour, Joe copied a large number of JAs using only a Panasonic DR49 with built-in whip antenna. Conditions must have been good that day.

Albert Tideswell, BRS48462, will be on holiday in Malta by the time this is read. He says that the first job on his return will be to refurbish the antennas in readiness for the autumn DX season. During May, Albert copied 7P8DX and S79F on 3.5MHz for two new countries. On the QSL front, confirmations arrived from BY4WNG, D68CY, FP8DX, JA6WFM/HR2, VP5/AA5AU and 3W8DX. It's nice to know that someone has a 3W8 QSL and that, at the time of writing, some others were still in Hungary.

Next, an interesting letter from Arthur Miller, BRS88969. He is gradually managing to improve on his scores for the year, although they are well down when compared with the corresponding period in 1988. At the end of April Arthur had only heard 117 countries on 7MHz and a mere 72 on 3.5MHz. He's still coming to grips with all the sophistication of his new NRD525, but the trusty old JR310 is used equally on the amateur bands. RB5EEU/UA0X was heard to give Arthur his final land-based ITU zone (Zone 25) and one of the three Oblasts he still needed. He still needs 174 and 175 (UA8T and UA8V) but reckons that they've never been activated - anyone know?

Colin Watson, BRS46958, has been his usual busy self on 14MHz and had a lot of good DX to report, including many VKs and V21AS. With the increase in Es propagation on 28MHz, Colin turned his attention to the FM part of the band around 29.5MHz and logged strong signals from various places in Europe.

Lastly in this HF section, I'm grateful to Martin Parry, BRS52543 and Robert Small, BRS8841, for the vast amount of detailed information on HF conditions which they supplied. From this, it's been possible to plot some of the better DX which was around the bands during May and early June. Summer conditions certainly seem to have taken over, with a great deal of short-skip; 28MHz produced some good stuff but you had to pick the right days on which to find it. Most of the DX was confined to

Africa and South America, with the odd opening to the Far East. Some 28MHz stations which put in an appearance were VK0GC, 3B8FV, 3DAOBK, 5H3NL, 6Y5HM, 7P8ER and 9M2BB. 21MHz appears to have had the best conditions, with good signals from the Pacific in the morning; the band also stayed open late at night and brought signals from the Far East and even ZL. Stations logged included T20AA, T26LP, FO5IW, VK0GC, KH6IJ, FO0BEF and KN0E/KH3. For a change, conditions on 14MHz were poor; however, CW accounted for T33JS and OT8C, the latter apparently located on Isla del Cona, off Costa Rica. The only other band to get a mention was 7MHz, where ZS8MI (Marion Island) appeared (I couldn't half do with that one - Ed). Finally, a real fluke - Robert heard ZP5JCY on 1.8MHz while hunting for 4J1FS!

VHF LOGGINGS

As predicted last month, there's a lot to report about Sporadic E happenings at VHF. First, though, a few words about Band 1 TV. The Es arrived on the TVDX scene in mid-May, when RAI was copied on Channel 1A. Later in the same month TVE1 (Spain) could be seen on E2, E3 and E4 at the same time. RAI was good copy on 27 May, complete with 'Woody Woodpecker' cartoon - intellectual stuff, this TVDX! RTP (Portugal) was seen on 6 June, together with TVE1 on E2. YLE (Finland) was solid copy on E3 on 7 June. On the 10th, good pictures from TV Ljubljana (E3), ZDF and SWF-BADN (both E4) were available. TV pictures were seen until 0005 on the morning of the 11th. On the same day we were regaled with Kylie Minogue and Jason Donovan singing away on E4, whilst E2 and E3 had 'Highway to Heaven' with Michael Lander later on E4 as well. All in all, the stations most often seen during this period have been RAI, TVE and RTP.

On 50MHz, the number of callsigns appearing in logbooks as a result of Es propagation has been decidedly small considering the increased number of stations now licensed to use the band. There have been quite long periods with nothing apart from white noise coming out of the Rx. Having said that, we've received a considerable amount of information about DX via Es. Martin Parry, BRS52543 (IO83) certainly seems to have his 50MHz set-up working well. He sent in two pages of DX logged between 11 and 13 June. The 11th produced a number of French stations (rumour has it that only those above 50.2MHz have valid permits)

SPECTRUM ANALYSIS

around 1330. At about 1700 three LAs in JO49 and 59 and seven OHs in KP11, 20 and 32 were logged. The 12th gave Martin eight more OH stations in KP10 and 20, and the jewel in the crown was OH2BOZ/OH0M on Market Reef (JP90NH). FC1EAN/7X (JM36) was heard at 1952 on 13 June. Via the aurora on 10 June, Martin heard PE, GI, GM and LA on 50MHz.

David Whitaker, BRS25429 (IO93) has at last dispensed with the services of his 430MHz Yagi and now uses a 5-element Tonna for 50MHz, mounted at about 35ft AGL. The first DX appeared on 5 June in the shape of a clutch of Fs and a pair of 9Hs; the 6th produced 59 signals from CT1WW and there were several OHs on the 7th. On the 10th SV1EN and SV1OE (KM17VX) were welcome guests in the log. Before that, on the same day, David heard 21 squares in the aurora, including OH5NQ (KP30) and GM3XOQ (IO99). He also did well on the 11th, logging four CTs, six OHs (plus OH0M), a brace of Fs and two LAs. Market Reef appeared

again on the 12th, and the 13th provided FC1EAN/7X. Dave's beam was put through its paces again in the 50MHz contest on the 20th, when 86 stations were heard in 37 counties and 14 squares.

The 50MHz Es season started at your scribe's QTH on 18 May, when PE1MVJ/MM in IM86 was heard. French and Maltese amateurs provided the next DX until a backscatter Es opening to PA on 27 May - giving a new country and five new squares. 9H4W on Gozo was heard later in the day, running only 2.5 watts. The next Es worth mentioning occurred on 6 June when Los Squarebashers doing their thing from CT3 were heard at 1405. From here, the first opening to OH was on 7 June; KP11, 20 and 30 were heard. SV1OE put in an appearance on the 10th at 2231, after the aurora. G1CWP with his G0 callsign was heard from Gibraltar on the 11th, along with OHs in KP01, 11, 12, 24, 26 and 33. Several LAs were also about, including LA9LFA in JO49. On the 12th I logged OH2BOZ/OH0M from

1989 VHF TABLE					
SWL	50	70	144	430	Total
BRS32525	55/23	3/4	66/20	—	171
BRS25429	56/17	—	60/14	16/7	170
BRS31967	—	1/1	73/18	32/9	134
F11ATZ	4/4	—	59/20	7/3	97
BRS2543	28/13	4/4	15/7	13/4	88
BRS2088	5/3	—	18/8	—	34

The format of the table is squares and countries added together.

Market Reef. Nice to see a big DXpedition taking the time and trouble to run a 50MHz station and giving everyone probably their best non-F2 propagation on the band. Mind you, I wrote those words before hearing FC1EAN/7X (running 10W from JM36DR) on the following day!

Turning now to 144MHz, both David Whitaker and self caught the big Es opening to south-east Europe on 17 June. David heard 13YU, mainly in JE, KE and KD squares, together with LZ1QM (KN12), I7IWN (JN90) and I4XCC (JN63).

The opening lasted much longer and was more widespread here in London, starting at 1613 and ending at 2051. Some very good DX was

heard; there were 55 stations in 26 squares, of which 11 were new. The breakdown was 4 YO, 1 UO5, 8 LZ, 1 HG, 12 YU, 14 I, 2 IC8, 5 IT9, 5 IS0 and 3 TK. This event was by far the best ever heard here, and it was most interesting to monitor the band as the Es moved from UO5 to TK. Some of the best DX heard included UO5OB (KN45), YO3RG (KN34) LZ1KSP (MB), LZ2KHM (LD), LZ1WL (LC), LZ1KCP (KN21), YU1CF (KN03), LZ2AB (ND), I7WAF (JN90), I7LPW (JN81) and I9BAH (JM67).

Let's hope that this event wasn't the last of the season and that the column will report what listeners up and down the UK heard during July next month. Reports of activity to me, please, by 19 August.

DATONG ELECTRONICS LIMITED

AUDIO FILTERS MODELS FL2, FL3, FL2/A

Model FL3 represents the ultimate in audio filters for SSB and CW. Connected in series with the loudspeaker, it gives variable extra selectivity better than a whole bank of expensive crystal filters. In addition it contains an automatic notch filter which can remove a "tuner-upper" ally by itself. Model FL2 is exactly the same but without the auto-notch. Any existing or new FL2 can be upgraded to an FL3 by adding Model FL2/A conversion kit, which is a stand alone auto-notch unit. Datong filters frequently allow continued copy when otherwise a QSD would have to be abandoned.

FL2 £89.70 FL3 £120.37 FL2/A £39.67

ACTIVE RECEIVING ANTENNAS

Datong active antennas are ideal for modern broadband communications receivers - especially where space is limited.

- highly sensitive (comparable to full size dipoles)
- Broadband coverage (below 200MHz to over 30MHz)
- needs no tuning, matching or other adjustments
- two versions AD270 for indoor mounting or AD370 (illustrated) for outdoor use
- very compact, only 3 metres overall length
- professional performance standards
- both include mains power unit.

AD270 £51.75 AD370 £69.00

MORSE TUTOR

The uniquely effective method of improving and maintaining Morse Code proficiency. Effectiveness proven by thousands of users world wide.

- Practice anywhere, anytime at your convenience
- Generate a random stream of perfect Morse in four character groups
- D70 is unique "DELAY" control allows you to learn each character with its correct high speed sound. Start with a long delay between each character and as you improve reduce the delay. The speed within each character always remains as set on the independent "SPEED" control

■ Features: long life battery operation, compact size, built in loudspeaker plus personal cassette.

£56.35

Our full catalogue plus further details of any product are available free on request. Dealers in most countries, please send for list.

Credit cards accepted.

Goods normally despatched within 3 days subject to availability. All prices include V.A.T. P + P.



AH ELECTRONICS GBAQN Est over 20 years

MURPHY COMMUNICATIONS RECEIVERS type (C.A.S. MF/HF AP100335) Freq 60-555KHz and 1.4MHz-30MHz. AM and CW in 5 switched bands, 4 switched IF, bandwidths 8KHz, 3KHz, 1KHz and 200Hz, circuit lineup 2 RF amps, mixer, osc, 3 IF amps, BFO, detector, noise limiter, CW filter, 3 audio amplifier stages, 2 watts audio output into 600 ohms for speaker and headphones, receiver has 13 valves of the B7G type. Aerial input is for a long wire or 70 ohm dipole etc size only 12in x 13in x 14in high. Ideal receiver for the S.W.L. NOTE this receiver requires an external power supply of 250VDC at 75mA, 150V at 15mA, and 6.3VAC at 4Amps, supplied in as new condition packed in original packing crates as received from the M.O.D. with circuits and layout diagrams and alignment details, all fully checked before despatch. BARGAIN AT ONLY £110.00 plus £18.00 carriage.

RACAL RA17 MK2 RECEIVERS 500KHz to 30MHz in 30 1MHz bands, tuning readout is via a 35mm film scale with a total length of 5ft for every 1MHz. The RA17 is a professional grade communications receiver containing 23 valves, ideal for radio amateur or S.W.L. All receivers are ex M.O.D. and fully serviced in our own workshop supplied with a 3 month warranty, technical data on request. Price only £260.00. Buyer to collect.

CT436 DUAL BEAM OSCILLOSCOPES b/w 6MHz, ideal as a general purpose unit for audio or low freq RF applications, 23 valves, size only 10in x 9in x 14in all in excellent condition with circuits and notes, all tested before despatch, ONLY £75.00 carriage £12.00.

MARCONI TF2500 AUDIO POWER METERS, battery operated unit that measures from 10uW to 25 watts, and up to 150VAC at 10Hz to 1MHz, meter is calibrated in dBm, watts and volts, all in as new condition with handbook. £75.00.

CT471 ELECTRONIC MULTIMETER, made by G.E. Bradley Ltd, measures 1200 volts AC/DC current up to 1.2 amps, resistance to 1000 megohms, RF volts up to 400v at 500MHz, operates from 3 "D" batteries, supplied with all leads and RF probes. £50.00.

PYE FM10B CAMBRIDGE MOBILES 67.88MHz, 12 watts RF output, valve Tx section, for 12 or 24 volt supply, this is a boot mount unit and supplied less the control gear (hence the price) all in ex condition ideal for 4 metre band, with circuits ONLY £10.00 carriage £5.00.

TEKTRONIX D465 PORTABLE OSCILLOSCOPES b/w DC to over 100MHz in as new condition P.O.A.

WANTED for my own private collection - WW2 Military Radio Equipment AR11 and B2 spy sets, HRO, T1154, No19 set and accs. BC342, etc, W.H.Y.

151a Bilton Road, Rugby, Warwickshire CV22 7AS. Tel: Rugby (0788) 76473

LOSING DX?

FAULTY ANTENNA? Check fast with an **ANTENNA NOISE BRIDGE** Measure RESONANCE 1-160MHz and RADIATION RESISTANCE 2-1000 ohms, without transmitting, even outside the bands, no 10 second limit, fun-to-build kit, all parts, pcb, pre-wound transformer, case, postage etc, only £27.90, and details of other kits from

CAMBRIDGE KITS

45 (RV) Old School Lane, Milton, Cambridge.

G4ZPY PADDLE KEYS

SEE! Britain's first GOLD PLATED Morse Keys displayed on our stand at Woburn Abbey & Bolton Rallies.

Send for our Colour Illustrated Brochure.

4 1/4" x 6 1/4" SAE to: 41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG. Phone No. 0704 894299.



Datong Electronics Limited, Department RC, Clayton Wood Close, West Park, LEEDS, LS16 6GE Tel: (0532) 744822 (2 lines).

ICS

ICS Electronics Ltd.

NEW PRODUCTS FROM AEA Inc. !



MM-3: The Ultimate Morse Keyer

- 20 Memory contest Keyer
- Beacon Mode
- Three sophisticated training modes, including simulated QSOs
- 2-99 wpm
- RS-232 computer interface

What can we say, other than that this will be another world beater. It is the latest in a long line of keyer developments from AEA and nothing else comes close.

£189.95 inc VAT plus £2.50 p + p

AT-300 Antenna Tuner

- Large, low loss enclosure
- Unique low pass design for enhanced harmonic reduction
- Dual Needle SWR meter
- Balanced, Unbalanced outputs

Just plain old fashioned, no compromise good engineering. AEA resisted packing this unit into too small an enclosure to keep RF losses to an absolute minimum.

£229.95 inc VAT plus £4.00 p + p

MACRATT

Facsimile and data software for the PK-232 and Apple Macintosh computer. A new standard of user friendliness.

£59.95 inc VAT plus £2.50 p + p

ALL PREVIOUSLY ADVERTISED PRODUCTS ARE STILL AVAILABLE, BUT PLEASE CHECK PRICES BEFORE ORDERING DUE TO THE PRESENT UNCERTAIN EXCHANGE RATE CLIMATE.

Full 12 months warranty. Applications assistance always. Visitors by appointment. Prices may vary according to exchange rates

**ICS Electronics Ltd. Unit V, Rudford Industrial Estate, Ford, Arundel,
West Sussex BN18 OBD**

Telephone: 0903 731101 - Facsimile: 0903 731105

KENWOOD

amateur radio equipment

When only the best will do

More of everything except cost



Not many of you will realise that this is the Centenary year of a little known Russian designer called Ivan Itchifinga, whose claim to fame was that he invented the finger operated push button. In the early years his invention was not very popular, but by the 1980s many equipment designers began to incorporate Ivan's push button at every opportunity with the eventual result that some amateur radio transceivers simply bristled with the d...d things.

I say "some" transceivers, because the Kenwood designers have always demonstrated an uncanny ability to make their equipment easy to use by real human beings, and this ease of use comes from minimising the number of push button operated "gimmicks" on the front panel. This is not good news for the Ivan Itchifinga Trust Fund, but it makes a lot of sense for those radio amateurs and listeners who want to actually use their equipment rather than counting the number of superfluous excrescences on the front panel.

The totally new range of VHF and UHF transceivers which Kenwood are now introducing all demonstrate what I mean about elegant simplicity of operation, and although having every useful and desirable feature anyone could want in a transceiver, they are all easy to use and made attractive by their relative lack of Itchifinga buttons.

The range currently comprises the TM-231E for 2 metres, the TM-431E for 70 centimetres, and the TM-531E for 23 centimetres and the superb TM-701E 2M/70cm dual bander. Since they are all designed to be a matching series, their appearance is somewhat similar, so I show only the photograph of the TM-701E.

The TM-701E is a most versatile animal, giving you full coverage of both 2 metres and 70 centimetres, with 25W output on

both bands, all the repeater shifts you need, and the ability to operate in full cross band duplex, which means that for those who are properly licenced it can operate as a cross band repeater.

The TM-231E puts out a massive 50W on 2 metres, the TM-431E 35W on 70, and the TM-531E 10W on 23cm. For the increasing number of users of 23cm FM for packet radio links, the TM-531E is proving an ideal transceiver, and many are now burbling away happily to each other — mind you, with the acknowledged excellence of Kenwood audio quality, they are also equally at home on your favourite repeater or simplex channel.

The most remarkable thing about the new Kenwood range is that you can have Kenwood quality and performance for surprisingly low cost. If you compare prices with competing models from other manufacturers, you will find Kenwood hard to beat and difficult to resist.

For full details, just ask or call at your nearest Lowe branch or approved Kenwood dealer.

TM-231E	(2m)	£289
TM-431E	(70cm)	£318
TM-531E	(23cm)	£385
TM-701E	(2/70)	£469

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482
Shops in GLASGOW Telephone 041-945 2626, DARLINGTON Telephone 0325 486121, CAMBRIDGE Telephone 0223 311230.

25 years in amateur radio

NRD-525 from JRC



The NRD-525 is a most remarkable receiver; probably the most praised, and certainly the most sought after receiver by professionals and hobbyists alike. Of course, it comes from a most remarkable company, JRC, who have been making radio communications equipment since 1915 and are now one of the world's largest manufacturers in the field.

The NRD-525 impresses by its discreet command of the incoming signal, whether it be a weak CW station, or a megawatt broadcaster — and better still the weak CW alongside a megawatt broadcaster. From 90kHz to 34MHz, in any mode, and even up to VHF and UHF with an optional converter, the NRD-525 simply dominates with sheer performance.

Why not ask us for full details of the NRD-525, and read why it has to be the receiver you would like to own one day.

NRD-525 £1095 inc VAT.

JST-135 from JRC



We waited a long time to see the JST-135 transceiver, but it was worth the wait. Whether you use the JST-135 as a complete station in its own right, or couple it to the NRD-525 to make what must surely be the ultimate HF station, you cannot fail to be impressed.

The attention given to detail design is truly exceptional, and the JRC designers have constructed the JST-135 up to the highest standards, not down to a price. Owning such a transceiver is the dream of most radio amateurs, and an orderly queue is already forming for the first deliveries.

As in the case of the NRD-525, it is totally impossible to describe this transceiver in a few short words, so I won't even try. We have prepared an information pack on these two remarkable JRC products and it is available on request.

JST-135 £1195 inc VAT

The Open Day — Saturday, August 19th, 1989

After a year without an Open Day (to allow us to draw breath), it seems most appropriate to have another one, particularly as this our 25th anniversary year. So — on August 19th the Emporium will be thrown open for anyone to come and see what lies behind the showroom you normally visit. This is intended to be a good day out, so we shall be putting on attractions for all the family, including we hope some live steam in action. John Coggins should be bringing his Royal Signals wireless truck, and for the other side we are lucky to be having the only completely original and restored WW-2 German Kubelwagen.

There will be an area for a car boot sale, and we won't restrict it to amateur radio gear so now is the time to clear the attic or the garden shed, (or possibly to sell your car boot?). Also in attendance will be other well known traders and some of the familiar magazines.

I am reliably informed that we should have some attractive special offers going on the day (no — the offers do not include any of our attractive lady staff, although it's an intriguing thought). Roll up, roll up, and see the tattooed lady — actually it's Beryl with a circuit of the TS-440S drawn on her back in ball point pen.

Those of you who have been here before on our Open Days will know how enjoyable they are. We look forward to seeing as many visitors as we can, so book August 19th in your diaries NOW, and pray for sunshine.

Name
Address

Post Code
FREE INFO.
Don't forget £1
to cover postage.
R.C.

All branches are closed all day Monday.

S. WALES (BARRY) Telephone 0446 721304, **LONDON** Telephone 01-429 3256 **BOURNEMOUTH** Telephone 0202 577760

SMC

South Midlands Co

S M HOUSE, SCHOOL CLOSE, CHANDLERS FORD INDUSTRIAL ES

Opening hours 8.45 pm-5.15 pm Monday-Thursday 8.45-5.00 pm Friday, 9.00 am-1.00 S

FREE FINANCE — buy now, save up to 36.9% — 0% Interest Subject to Status

The
FT470
2m X 70cms

FT411
2m Keypad

**LIGHT
IN THE
HAND AND
ON THE
WALLET**



The newest range of handhelds from Yaesu have all the very best in current electronic circuit technology combined with outstanding ergonomic design to produce a powerful yet extremely compact family of radios. The cases have rubber gasket seals around all the external controls and connectors to keep out dust, rain or spray and are fully compatible with all the existing FT23R accessories.

Top of the range must be the amazing FT470 Dualbander with a full 5W RF output on both 2m and 70cms (with FNB12). Dual independent IF circuits allow simultaneous reception on both bands with an audio balance keypad. Forty two memories, 4 VFO's, and Power Saver are just a few of the functions available at the touch of a button. Next in line are the FT411 and FT811, single band 2m or 70cms transceivers. Up to a full 5W RF output is available (with FNB12). A 16 button keypad gives access to all the comprehensive user functions, including forty nine memories, dual VFO's, delectable Automatic Power Off and Power Saver to, name but a few.

FT470, FT411 & FT811 are only available from authorised Yaesu dealers. Radio shown approximately full size c/w FNB10, N.B. The FT728 is a model intended for the Japanese domestic market and does not have all the facilities required for the UK market. Both Yaesu and SMC do not recommend the purchase of this model as Yaesu's factory back-up service for the FT728 is only valid in Japan.

BIRMINGHAM
SMC (Birmingham)
504 Alum Rock Road
Alum Rock, BIRMINGHAM
021-327 1497/6313
Tue-Fri 9.00-5.00
Sat 9.00-4.00

LEEDS
SMC (Northern)
Nowell Lane Ind Est
Leeds LS9 6JE
(0532) 350606
9-5.30 Mon-Sat
Closed Sat afternoon

CHESTERFIELD
SMC (Midlands)
102 High Street
New Whittington
Chesterfield
(0246) 453340
9.30-5.30 Tue-Sat

BUCKLEY
SMC (TMP)
Unit 27, Pinfold Lane
Buckley, Clwyd
(0244) 549563
10-5 Tue, Wed, Fri
10-4 Sat

JERSEY
SMC (Jersey)
1 Belmont Gardens
St Helier, Jersey
(0534) 77067
9-5.30 Mon-Sat
Closed Wednesday

AXMINSTER
Reg Ward & Co Ltd
1 Western Parade
West Street
Axminster, Devon EX13 5NY
(0297) 34918
9.00-5.30 Tue-Sat

SOUTH WALES AGENT: JOHN DOYLE, TRANSWORLD COMMS, NEATH (0639) 632374 DAY (0639) 642942 EVE

YAESU OFFICIALLY APPOINTED SOLE U.K. DISTRIBUTOR

YAESU FT736R THE KING OF VHF/UHF BASE STATIONS



- ★ UP TO FOUR BAND CAPABILITY
- ★ LSB/USB, CW & FM
- ★ FULL DUPLEX CROSSBAND OPERATION
- ★ MEMORY STORAGE OF UP TO 230 FREQUENCIES
- ★ KEYPAD FREQUENCY ENTRY
- ★ FOURTEEN VFO's
- ★ GLOBAL CALL CHANNEL
- ★ PROGRAMMABLE CHANNEL STEPS
- ★ ELECTRONIC KEYSER OPTION
- ★ REMOTE PREAMPLIFIER SWITCHING
- ★ TXCO HIGH STABILITY REFERENCE OSCILLATOR

OPTIONAL ACCESSORIES

FEX 736/50	50MHz module	£239.00	XF455MC	600Hz CW Filter	£60.00
FEX 736/1.2	1.2 GHz module	£425.00	SP767	External Spkr c/w Audio Filters	£69.95
FMP-1	AQS Message Processor c/w display	£189.00	MD-1B8	Desktop Microphone	£79.00
FTS-8	CTCSS Tone Squelch Unit	£60.38	MH-1B8	Hand Scanning Microphone	£21.00
FVS-1	Voice Synthesiser Unit	£33.00	FIF232Cvan	CAT/TNC Interface for Packet & CAT	£125.00
D3000535	Keyer Unit B	£15.95	FIF232C	CAT Interface for RS232 O/P	£75.00
D3000534	Fast Scan TV (ATV) Unit	£159.00	FIF65A	CAT Interface for Apple II series	£60.00

FT736R RRP £1359 c/w 2m & 70cms



SUMMER SPECIALS AND STOCK CLEARANCE OFFERS



SP980P	Extension L/S C/W Phone Patch	75.00*	D3000337	FTV901 Mod Kit for use with FT980	10.00	S72	FT720R Band Switch Box Unit	5.00*
FT770RH	70cm FM Transceiver 25 Watts O/P	259.00*	D3000071	FT301D Improved Counter Unit	19.95	E72L	FT720R Extension Cable 4m	9.50
FT270RH	2m FM Transceiver 45 Watts O/P	239.00*	D4000006	Cable FTONE to FL2100Z	1.50	MMB3	FT720R RF Deck Mount	5.00
FT230R	2m FM Transceiver 25 Watts O/P	199.00*	D4000007	Cable FTONE to FTV107R	1.50	DIG221RM0D	FT221R Digital Display Buffer Kit	3.00
FT790R	70cm Multimode 1 Watt O/P	249.00*	D4000008	Cable FTONE to FC707	1.00	78B	2m 7/8 Wave Mobile Antenna	15.00*
144TV	2m Unit for FTV901/107/707 Transverter	59.00*	YF107F2.4	Xtal Filter 10.7MHz 2.4kHz 6 pole	15.00	88F	2m 8/8 Wave Mobile Antenna	18.00*
430TV	70cm Unit for FTV901/107/707 Transverter	149.00*	YF107H12	Xtal Filter 10.7MHz 12kHz 6 pole	15.00	GP23	2m Colinear 3 x 5/8 Wave Base	45.00*
144/726	2m Unit for FT726R	169.00*	YF107H600	Xtal Filter 10.7MHz 600Hz 8 pole	15.00	HF3VNB	12-17-30m Vertical Base Antenna	73.15*
21/24/28	HF Unit for FT726R	169.00*	YF90H12	Xtal Filter 9MHz 12kHz 8 pole	15.00	MEM901	FT901/2 Memory Unit	49.00
FP80A/FYP80	Yaesu PSU 4.5 Amps 13.5v	39.00*	TF30F12	Xtal Filter 3.18MHz 12kHz 6 pole	15.00	RFP/B	FL101 Speech Processor S no after 308001	19.00
FV700DM	External VFO Unit for FT77 or FT707	139.00*	TF30H12	Xtal Filter 3.18MHz 12kHz 8 pole	15.00	SETONE	Service Kit for FTONE	39.00
MMB11	Mobile Mount FT290R/790R	29.00	XF30B	FR101 AM Filter	15.00	QTR24D	Yaesu 24hr clock	29.95
MMB1	Mobile Mount FT101/FT901 etc	10.00	XF30D	FR101 FM Filter	15.00	VOX/CAL	Vox and Calibrator Board FT301S	15.00
MMB7	Mobile Mount FT7/7B	7.50	XF455C	FT102 500Hz CW Filter	29.00	BHFRG7	Battery Holder for FRG7	1.50
NDH51B	Memory Unit for NRD515	159.00*	XF455CN	FT102 270Hz CW Filter	29.00	J0110	SWR/PWR Meter 1.5-150MHz	12.50
FMUT77	FM Unit FT77	29.00	XF8.9GA	AM Filter FT101Z FT901/2	10.00	FS711V	SWR/PWR Meter 50-150MHz 2/200W Remote Head	35.00
FMUT901	FM Unit FT901/902	29.00	XF8.9GF	FM Filter 12kHz FT901/2	19.00	401B	Shure Hand mic Low Impedance	19.95
AMUT77	AM Unit FT77	12.50	XF8.9HC	CW Filter 600Hz FT101Z, 901/2, 707, 980	29.00	SP4+SPV100Z	Speech Processor + Mains PSU	29.00
AMFMUT102	AM/FM Unit FT102	49.00	XF82GA	FT102 6kHz AM Filter	15.00	FF5	500kHz RX Low Pass Filter	2.50
MRKT77	Marker Unit FT77	10.00	XF82HC	FT102 600Hz CW Filter	15.00	WARC/101Z	FT101Z Warc Mod Kit	29.95
D3000105	Bandscope Unit for Y0901	19.50	XF82HCN	FT102 300Hz CW Filter	15.00	FP4	Yaesu PSU 13.5v 4 Amp	35.00
D3000253	NB Mod Kit for FTONE	7.50	XF82HSN	FT102 1.8kHz SSB Filter	25.00	FYG1	Yaesu Crystal Checker	5.75

Carriage on the starred (*) items £5.75, on all other items £2.20.
All offers subject to availability. Free finance is not available on these special offers.

FREE FINANCE ON SELECTED ITEMS
On many regular priced items SMC offers
Free Finance (on invoice balances over £120)
20% down and the balance over 6 months or
50% down and the balance over a year.
You pay no more than the cash price!
Details of eligible items available on request
Subject to status.

Free interlink delivery on major equipment.
Small items, plugs, sockets, etc by post £1.75.
Antennas, cables, wires and larger items. Lynx
up to £5.75. Interlink delivery available, upon
request for items other than radios from £7.30
depending on weight. Same day despatch
whenever possible.

YAESU DISTRIBUTOR WARRANTY
Importer warranty on Yaesu Musen products.
Able staffed and equipped Service Department.
Daily contact with the Yaesu Musen factory.
Tens of thousands of spares and test equipment.
Twenty five years of professional experience.
Prices and availability subject to change without
prior notice.

COMET & HOKUSHIN ANTENNAS

New from Comet the GTI range of antennas for those of you who don't want your hot hatchback to look like a porcupine. Comet have created the new CHL21J and CHL23J mini dual band antennas, for best performance we recommend you use the matching mounts TBR, RS17 for hatchbacks and coming soon the RS16 mini gutter mount and CK-3LX mini cable assembly.

CHA5	WX1	CA2X4WX	CF416MN
HF Vertical	VHF/UHF Base	VHF/UHF Base	Duplexer
80-10M 5 Band	144/432 MHz	144/433MHz	1.3-150MHz/
C/W Radials	4.5/7.2dB Gain	6.5/9dB Gain	400-540MHz
200 W Pep	200W Max	200W Max	PL VHF/HF 'N' UHF
£210.00	£49.95	£79.00	200W/100W UHF
			£25.50

MOBILE ANTENNAS

20W	2M 1/4 WAVE	£4.95
2NE	2M 5/8 WAVE FOLD OVER	£13.25
2VF	2M 1/2 WAVE FOLD OVER	£16.13
78B	2M 7/8 WAVE BALL MOUNT	£15.00
78F	2M 7/8 WAVE FOLD OVER	£21.50
88F	2M 8/8 WAVE	£24.10
258	70CM 2 x 5/8 WAVE	£29.37
358	70CM 3 x 5/8 WAVE	£33.73
268E	70CM 2 SECTION COLINEAR	£32.80

BASE ANTENNAS

ABC123	2M 3 x 5/8 COLINEAR	£63.97
GP23	2M 3 x 5/8 COLINEAR	£45.00
GP144W	2M 2 x 5/8 COLINEAR	£42.00
GP144DX	2M 2 x 5/8 COLINEAR S/S	£53.13
SQ144	2M SWISS QUAD VERT/POL	£53.13
GP432X	70CM 3 x 5/8 WAVE COLINEAR	£88.20
WX1	2M/70CM COLINEAR	£55.00
CA2X4WX	2M/70CM COLINEAR	£79.00
CA2X4MAX	2M/70CM COLINEAR HIGH GAIN	£99.95
CF416MN	DUPLEXER 1.3-150/400-540MHz	£25.50

DUAL BAND MOBILE

70N2M	2M 1/2 WAVE 70CM 2 x 5/8	£24.95
70N2DX	2M 5/8 WAVE 70CM 3 x 5/8	£37.75
CHL21J	MINI DUAL BAND MOBILE	£14.95
CHL23J	SMALL DUAL BAND MOBILE	£16.90
CA2X4KG	2M x 5/8 70CM 4 x 5/8	£39.95

ANTENNA MOUNTS

GCCA	GUTTERMOUNT AND CABLE	£14.25
HTMCA	S/S TRUNK MOUNT AND CABLE	£19.50
SOMM	MAG MOUNT AND CABLE	£12.75
SOGA	4 MTR CABLE	£6.90
TBR	S/S HATCH BACK MOUNT NEW	£11.25
RS17	MINI HATCH BACK MOUNT NEW	£12.50

CARRIAGE BASE ANTENNA £4.50, MOBILE ANTENNAS £3.00, CABLES AND MOUNTS £2.50

SONY RECEIVERS



SMC are pleased to be able to offer the SONY range of Multiband Receivers. They feature all the latest technology allowing unequalled coverage of both broadcast and shortwave bands, yet remaining both compact and easy to use. All the models illustrated cover VHF Broadcast, SW broadcast and some SW or Air bands (only on certain models).

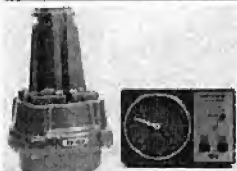
ICF7600DS	ICF200ID
Compact, synthesised portable receiver covering FM Broadcast, AM Broadcast (LW & MW) and SW bands with SSB. Large LCD display. Keypad entry and memory scanning.	Compact, lightweight synthesised receiver including FM Broadcast, AM Broadcast (LW & MW) Airband and SW Bands with SSB. Keyboard entry, memory scanning and numerous other functions.
ICFPR080	AIR-7
Compact, handheld scanning receiver covering 150 KHz to 108 MHz and 115.15 to 223 MHz. SSB, FM (W & N), AM modes. 40 memories and PRO80 8 way timing system.	Compact, handheld scanning receiver AM/FM reception covering, VHF broadcast airband and AM Broadcast (MW), 30 channel memory and Keypad entry.

ICF7600DS...£159 ICFPR080...£299

ICF200ID...£299 AIR7...£299

A full range of accessories is also available
Carriage free on all above Receivers (not accessories)

ROTATORS



Superb engineering standards combined with pin sharp setting accuracy means new technology from Yaesu create Kenpro Hygain.

ROTATORS

AR200XL	OFFSET TYPE 3 WIRE	£38.50
G-250	BELL TYPE TWIST/SWITCH CONTROL	£78.00
G-400	BELL TYPE METER CONTROLLER	£139.00
G-400RC	BELL TYPE ROUND CONTROLLER	£169.00
G-600RC	BELL TYPE ROUND CONTROLLER	£219.00
CD45	BELL TYPE METER CONTROLLER	£218.90
HAM1V	BELL TYPE METER CONTROLLER	£327.00
T2X	BELL TYPE METER CONTROLLER	£449.00
G-800SDXBELL	TYPE 450 DEG VAR. SPD.	£325.00
G-1000SDXBELL	TYPE 450 DEG VAR. SPEED.	£368.00
G-2000RCBELL	TYPE ROUND CONTROLLER	£445.00
KR500	ELEVATION METER CONTROLLER	£149.95
KR5400	AZIMUTH/ELEV DUAL CONTROL	£279.00
RC5-1	BELL TYPE ROUND CONTROLLER	£219.00
RC5A-3	BELL TYPE VAR. SPEED AND PRESET	£425.00
RC5B-3	BELL TYPE VAR. SPEED AND PRESET	£675.00

ROTATOR HARDWARE

AR200AB	ALIGNMENT BEARING AR200XL	£17.50
KS505	ROTARY BEARING 1 1/2" MAST	£19.95
GS-065	ROTARY BEARING 2" MAST	£29.95
GC-038	LOWER MAST CLAMP G-400, 600 etc.	£16.95
9523	CHANNEL MASTER BEARING	£19.95
CK46	ROTARY BEARING 1.5 - 2.5 MAST	£34.95
MC1	LOWER MAST CLAMP RC5 SERIES	£25.00

ROTATOR CONTROL CABLE

RC5W	5 WAY G-400RC, 800, 1000SDX PER MTR	£0.48
RC6W	6 WAY G-250, 400, 600 RC KR500 PER MTR	£0.66
RC8W	8 WAY HAM1V, T2X 2000RC RC SERIES PER MTR	£0.72

CARRIAGE:

ROTATORS FREE, ROTATOR HARDWARE £2.85, ROTATOR CABLE £2.20 UP TO OVER 20 MTRS. OVER 20 MTRS £3.00

STRUMECH VERSATOWER



MINITOWER 10M10 Series

10M10P3030FT POST MOUNTING	£482.50
10M10BP3030FT BASE PLATE MOUNTING	£511.00
10M10FB3030FT FIXED BASE MOUNTING	£475.00

STANDARD 13M20 SERIES

13M20P2525FT POST MOUNTING	£392.50
13M20P4040FT POST MOUNTING	£536.50
13M20BP6060FT POST MOUNTING	£652.00
13M20FB2525FT FIXED BASE MOUNTING	£300.00
13M20FB4040FT FIXED BASE MOUNTING	£448.00
13M20FB6060FT FIXED BASE MOUNTING	£571.00
13M20BP2525FT BASE PLATE MOUNTING	£477.50
13M20BP4040FT BASE PLATE MOUNTING	£623.50
13M20BP6060FT BASE PLATE MOUNTING	£741.00
13M20M2525FT MOBILE TOWER	£2176.00
13M20M4040FT MOBILE TOWER	£2393.00
13M20M6060FT MOBILE TOWER	£2553.00

HEAVY DUTY 16M20 SERIES

16M20P4040FT POST MOUNTING	£803.50
16M20BP6060FT POST MOUNTING	£911.50
16M20BP8080FT POST MOUNTING	£1426.50
16M20FB4040FT FIXED BASE MOUNTING	£644.50
16M20FB6060FT FIXED BASE MOUNTING	£763.50
16M20FB8080FT FIXED BASE MOUNTING	£1219.00
16M20BP4040FT PLATE MOUNTING	£851.00
16M20BP6060FT BASE PLATE MOUNTING	£953.00
16M20BP8080FT BASE PLATE MOUNTING	£1531.00
16M20M4040FT MOBILE TOWER	£2790.50
16M20M6060FT MOBILE TOWER	£2965.50
16M20M8080FT MOBILE TOWER	£3681.00

ALL TOWERS EXCEPT MOBILES ARE AVAILABLE FROM STOCK.
10M10 AND 13M20 SERIES SUPPLIED WITH STANDARD WINCHES.
16M20 SERIES SUPPLIED WITH AUTO BREAK WINCHES. ALL ARE SUPPLIED WITH HEAD UNIT DRILLED TO TAKE GS-065 BEARING.
HOLDING DOWN BOLTS FOR BP AND FB TOWERS ARE AVAILABLE AT £28.75 PER SET EXTRA.

ALTERNATIVE WINCHES AND HEAD UNITS ARE AVAILABLE AT EXTRA COST.
DELIVERY IS BY QUOTATION DEPENDENT UPON DISTANCE.

MORSE KEYS



MORSE KEYS

KEY	PRICE	P.P.
HK702	STRAIGHT KEY	£42.95 1.75
HK703	STRAIGHT KEY	£38.45 1.75
HK704	STRAIGHT KEY	£26.35 1.75
HK705	STRAIGHT KEY	£22.49 1.75
HK706	STRAIGHT KEY	£21.80 1.75
HK707	STRAIGHT KEY	£20.15 1.75
HK708	STRAIGHT KEY	£21.50 1.75
HK710	STRAIGHT KEY	£39.95 1.75
HK711	STRAIGHT KEY KNEE MOUNTING	£41.75 1.75

BK100	MECHANICAL BUG	£34.95 2.00
MK701	SINGLE LEVER PADDLE	£38.35 1.75
MK702	SINGLE LEVER PADDLE	£36.25 1.75
MK703	SQUEEZE KEY	£34.50 1.75
MK704	SQUEEZE KEY	£20.00 1.75
MK705	SQUEEZE KEY	£32.78 1.75
MK706	SQUEEZE KEY	£30.48 1.75
HK802	DELUXE BRASS KEY	£112.54 2.50
HK803	DELUXE BRASS KEY	£107.75 2.50
HK804	DELUXE BRASS KEY	£99.69 2.50

MORSE EQUIPMENT

KP100	SQUEEZE KEYS	£109.75 2.50
DEWSKEYSD	STAR MASTER KEYS	£54.69 2.50
DEWSKEY M	STAR MASTERKEY MEMORY	£94.99 2.75
D70	MORSE TUTOR	£56.35 FOC

DATA TERMINAL

PK232/FAX/NAVTEX	MULTIMODE DATA TERMINAL	£279.95 FOC
------------------	-------------------------	-------------

SMC LTD, SM HOUSE, SCHOOL CLOSE, CHANDLERS FORD
INDUSTRIAL ESTATE, EASTLEIGH, HANTS SO5 3BY.
Tel (0703) 255111. Telex 477351 SMCMM G. Fax: (0703) 263507





IS YOUR AMATEUR RADIO



EQUIPMENT PROPERLY INSURED?

Amateur Radio Insurance Services can offer you a comprehensive insurance for your amateur radio equipment at a cost you can afford. We operate 2 Schemes both specially designed for RSGB members as follows:-

SCHEME 1 — Provides full cover for home use and mobile/portable operation.

Free Worldwide extension for a maximum period of 30 days.

SCHEME 2 — Provides full cover for Base Stations.

Special Extension for equipment whilst at or in transit to or from any Rally, Field Day, Club Meeting, Building or Caravan when on holiday.

APPLYING TO BOTH SCHEMES

- * Cover on a "new for old" replacement basis.
- * Insures all radio and ancillary equipment including masts, antennae, rotators plus home computers and peripherals.
- * Plus up to 10% inflation increase per item on claims payments.
- * Equipment up to £2,000 automatically insured immediately after purchase so long as we are advised within 7 days.

ADDITIONAL FEATURES

- * Optional Liability Extension — covers you against your legal liabilities to Third Parties arising from the ownership and use of your equipment. Limit of Indemnity £1,000,000. Additional premium £3.00.
- * Theft from unattended vehicles automatically covered up to £1,000, excluding the first 25% of any claim. The limit can be increased from £1,000 to £2,500 at an additional premium of £15.00.

PREMIUM TABLES

SCHEME I (Mobile, portable and home)			SCHEME II (Base station only)		
SUM INSURED (i.e. replacement cost of all your equipment)		YEARLY PREMIUM	SUM INSURED (i.e. replacement cost of all your equipment)		YEARLY PREMIUM
From	To		From	To	
£0	£1,000	£22	£0	£2,000	£15
£1,001	£2,750	£35	£2,001	£3,000	£20
£2,751	£3,500	£40	£3,001	£4,000	£25
£3,501	£5,000	£50	£4,001	£5,000	£30
£5,001	£6,500	£60	£5,001	£6,000	£35

For each additional £1,000 band of sum insured over £6,500 add £5 to the premium of £60

For each additional £1,000 band of sum insured over £6,000 add £5 to the premium of £35.

Complete the application below and return with your cheque made payable to ARIS to:

**AMATEUR RADIO
INSURANCE SERVICES,
FREEPOST,
4A RUSSELL HILL ROAD,
PURLEY CR2 9PZ.**

Or telephone Sarah on 01-660-0820 if you have any queries.

AMATEUR RADIO INSURANCE SCHEME APPLICATION CORNHILL INSURANCE PLC

TITLE _____ INITIALS _____ SURNAME _____
(BLOCK LETTERS)

ADDRESS _____

POST CODE _____

CALL SIGN OR RS NUMBER _____

1. The equipment listed is to be insured under (only tick box of scheme required):

SCHEME I (HOME, MOBILE, PORTABLE) ☐ **OR** **SCHEME II (BASE STATION)** ☐

2. Do you require the optional liability extension?
(Liability limit £1,000,000. Additional premium £3.00) YES/NO

3. For Scheme I only. Do you want to increase the 'theft from vehicle' limit from £1,000 to £2,500? (Additional premium £15.00) YES/NO

4. Do the sums represent the full replacement value of the equipment to be insured under this scheme? YES/NO

5. Have you or any members of your family normally residing with you:
(a) suffered any losses in respect of your equipment for any of the risks proposed with the last three years? YES/NO

If yes give details _____

(b) In insuring your equipment had a proposal declined, a renewal refused, cover terminated, special terms or conditions imposed by any insurer? YES/NO

If yes give details _____

(c) been convicted of arson or any offence involving dishonesty of any kind, e.g. fraud, robbery, theft or handling stolen goods?

YES/NO

If yes give details _____

6. State any other material facts below. Material facts are those facts which are likely to influence us in the acceptance or assessment of this proposal and it is essential that you disclose them. If you are in doubt about whether a fact is material then for your own protection you should disclose it since failure to do so could invalidate your policy.

Declaration

1. I am a member of the Radio Society of Great Britain or an affiliated Club or Society.
2. All property to be insured is in a good state of repair and will be so maintained.

I declare that to the best of my knowledge and belief the above statements and particulars whether written by me or by others on my behalf are true and complete. I agree that the proposal whether signed by me or caused to be signed for me shall be the basis for the contract between Cornhill Insurance PLC and myself and I agree to accept the Company's standard form of policy for this class of insurance. A copy of the policy wording is available on request.

Date _____ Signature _____

PREMIUM DETAILS

Yearly premium (see Scheme I or Scheme II premium table) £

Plus if applicable

£3.00 for optional liability insurance £

£15.00 to increase 'theft from vehicle' limit to £2,500 (Scheme I only) £

Total of cheque attached payable A.R.I.S. £

**PLEASE ATTACH TO YOUR APPLICATION A LIST OF ITEMS
SHOWING THE MANUFACTURERS NAME, MODEL, SERIAL NO
IF POSSIBLE AND CURRENT REPLACEMENT VALUE
(SUM INSURED)**

TECHNICAL TOPICS

PAT HAWKER G3VA

HANDLING CHEMICALS

Many of the substances involved in electronics fabrication and servicing are potentially hazardous or damaging to the environment and need to be handled with care. For example, cleaning solvents including acetone, benzene carbon tetrachloride, ethyl alcohol, isopropyl alcohol, methylene chloride etc are all to some degree potentially harmful — some very harmful; most are highly flammable and the vapours can form dangerously explosive mixtures with air and may attack internal organs and the nervous system. When heated, some solvents are especially dangerous; chlorinated and fluorinated hydrocarbon fumes decompose into hydrochloric acid and phosgene, both highly toxic and corrosive to eyes, throat and lungs. Even the fumes given off by the fluxes used in some cored solders, long regarded as completely harmless, have been found to cause asthma symptoms, among those employed in electronic assembly factories and good ventilation is advisable when carrying out a lot of soldering.

It is well known that when using ferric chloride for the fabrication of printed circuit boards, it is necessary to use plastic dishes, teaspoons, stirrers etc and to keep the etchant away from children, your fingers and clothes (it stains badly) as well as metal objects. But what about disposing of it once the boards have been completed?

Fred Longman, G3HOH has recently become interested in making his own PCBs for a range of QRP equipment but has been feeling a little uneasy about how to dispose of the ferric chloride afterwards. Although he searched through *TT* and *RadCom* articles on PCBs since 1983, he had found nothing on this particular aspect. In these days of growing environmental concern, it seemed advisable to seek expert opinion and I mentioned this to a very helpful member of DTI's Radio Investigation Service. In turn he got in touch with several authorities including *Thames Water*. The advice is that it is considered quite safe to flush a couple of pints of ferric chloride down a toilet — the authorities might become worried if they felt that several thousand people were likely to be doing this at the same time. Ferric chloride could be rendered harmless by adding washing soda but it is felt this is unnecessary for small quantities. One precaution: do *not* empty the ferric chloride into a stainless steel sink!

Unfortunately there are some materials used in electronics that require extremely high temperature furnaces. A number of warnings have been given in *TT* and elsewhere on such deadly substances as beryllium oxide and the deadly polychlorinated biphenyl (PCB) that still turns up in old dummy loads, high-voltage transformers and capacitors as a coolant (*TT*, September, 1984, p 861).

AMPLIFIER-DRIVER COMPATIBILITY

Without wishing in *TT* to harp too much on the question of SSB non-linearity problems, there can be little doubt that the increasing use of relatively high-power linear amplifiers on both HF and VHF bands does impose the need for high technical standards if transmissions are to be confined to a single channel. Intermodulation distortion in either the basic transceiver-exciter or the final amplifier or in both will spread out the signal in the form of 'splatter' causing interference to other transmissions on nearby frequencies. Several readers have commented that some recent 'equipment reviews' of HF transceivers show that even the products of

well-respected manufacturers have a third-order IMD performance on some bands significantly worse than on other bands, falling well short of what they consider to be desirable for neighbour-friendly amateur operation. I have never been certain whether such variations between bands are due primarily to the basic design or to the factory alignment and setting-up.

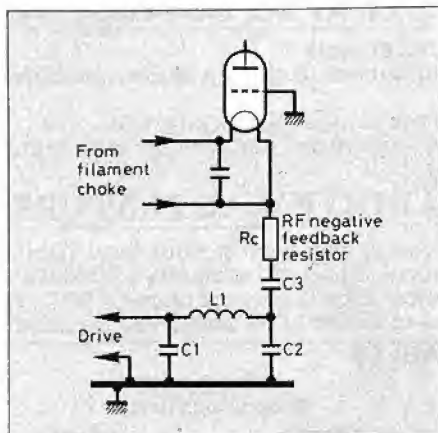


Fig 1. Addition of a negative feedback resistor (R_c) makes a grounded-grid amplifier more resistant to overdrive (AG6K, QST).

SWITCHED-VOLTAGE RECTIFICATION

The July *TT* included a brief review of a number of the standard rectifier arrangements used in both high-voltage and high-current power supply units, including basic dual-polarity and dual-voltage PSUs. By coincidence, shortly before this item was published, Alan Hobden, G3YNN sent along a novel arrangement that he is using for a switched-voltage supply. He writes:

"Whilst recently building a low-voltage power pack which turned out to have too low an output voltage, I was surprised to find how little it needed altering to make the bridge rectifier into a full-wave voltage doubler. The circuit (Fig 2) is extremely simple yet I cannot recall having ever seen it in print.

"My unit was a low-voltage power pack with a five-amp bridge rectifier and 1000 μ F 50Vwkg capacitors but I see no reason why this arrangement could not be used at other voltage levels with appropriate components."

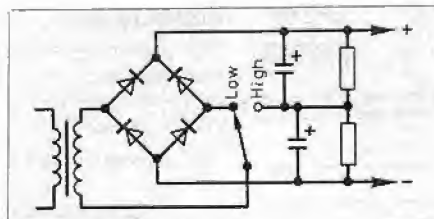


Fig 2. Bridge cum voltage-doubler rectifier circuit for switchable dual-voltage power pack (G3YNN).

Problems can also arise due to incompatibility between a transceiver and an add-on linear amplifier. This topic is discussed in some detail by Richard L Measures, AG6K in *QST* (April 1989, pp 17, 18, 20). This emphasises that some modern factory-built amplifiers require much less drive than the 100watts many transceivers provide, and that this may cause splatter even where automatic level control circuits are supposed to take care of this problem. His opening paragraphs are:

"About ten years ago, when amplifier tubes were much less costly, the two-tube amplifier was in vogue. During the last few years, a number of new amplifier designs, many of which use only one high- μ triode operating grounded-grid in class AB2, have appeared on the market. A single-tube amplifier has some advantages over a two-tube design: reduced parts count and cost, and the elimination of the possibility of a push-pull parasitic oscillation between two tubes. But the high-gain triodes now commonly used in single-tube amplifiers have a major drawback; they require *much* less drive (less than 20-75watts per tube for full (US legal limit) output) than that produced by contemporary transceivers (100watts or more). Overdrive is *guaranteed* when one of these tubes is driven with 100W; depending on the tube type (the 3CX800A7, for instance) 100W can overdrive *two* (or even three!) high-gain tubes.

"Overdrive pushes an amplifier tube out of linearity, and into gain compression. Increasing drive beyond the point at which compression begins causes a slight increase in power output but a great increase in IMD products. In theory amplifier-to-transceiver ALC is supposed to take care of the overdrive problem ... ALC has a serious flaw: *It doesn't act until the amplifier has already been overdriven* ... ALC is like trying to close the barn door when the horse is halfway out of the barn ... Fig 1 shows a simple and inexpensive way of correcting the overdrive. Addition of a cathode resistor, R_c , adds negative feedback to an amplifier and makes it more resistant to overdrive. Because R_c increases the amplifier input impedance, the values of the (existing) input-network reactances ($C1$, $C2$ and $L1$) may require adjustment when R_c is added. $C3$ is a DC blocking capacitor."

AG6K describes in the *QST* article how to determine value and rating of R_c and gives some examples:

Single 3-500Z: R_c 20ohms (four 20ohm, 2W flameproof resistors connected in series-parallel).

Single 8777: R_c 10ohms (four 10ohm, 2W metal-film flameproof resistors in series-parallel).

Two 3CX800A7: 40ohm resistor in series with cathode of each valve (each resistor made from five 200ohm, 2W (3W for RTTY) metal-film resistors in parallel).

MAKING BATTERIES LAST

Although all *TT* ideas should be regarded as "experimental", I am always relieved when from time to time I get the opportunity or need to try one myself, if I find they work for me! This certainly proved to be the case with the German idea, brought to notice by Tim Harrowell, G3IMI (*TT*, February 1988, p106) for rejuvenating "Dryfit" sealed lead-acid batteries. The 6V (three cell) battery of this type fitted in my ageing Uher 4000 Report IC portable tape recorder recently 'died' refusing to hold any charge whatsoever although still exhibiting a no-load voltage.

Although convinced it had reached the end of its useful life, on the off-chance I tried the

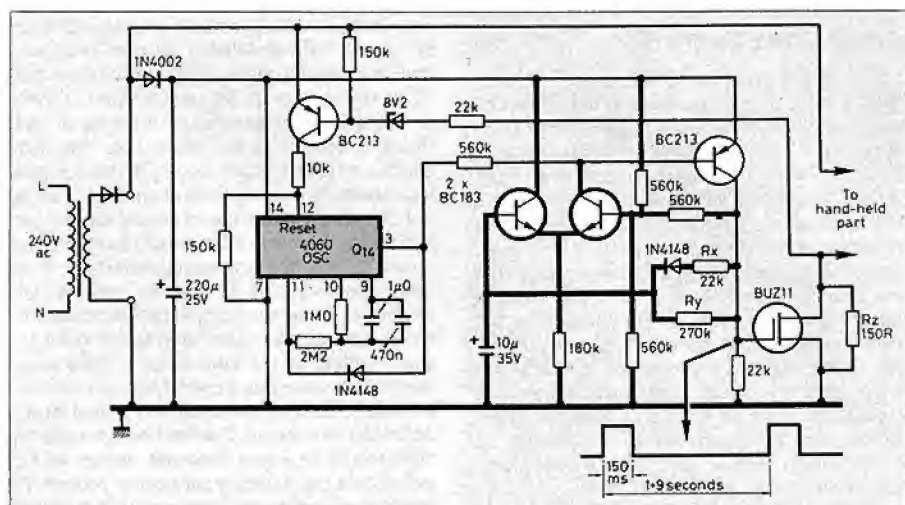


Fig 3. Nicad battery charger incorporating a timer to reduce greatly the charging rate after about seven hours to provide safe trickle charging.

suggested rejuvenation technique of drilling into each cell as shown in 77 and adding a little distilled water (produced by boiling a kettle and directing the steam into a succession of upturned saucepans as cooling devices arranged so that the condensed water ran into a dish). All very primitive and I did not even attempt to measure the amount dripped into each cell which was then later resealed. Yet it all worked a treat. The Dryfit battery now once again powers the Uher recorder for several hours per charge. If only all cures were as easy and as effective!

Mike Brown, G4RAA, after reading the notes on Nicad 'memory' in the June 77, tells me that he is still not convinced that in practice repeated partial discharges of nicad cells do not bring about serious 'memory effects', 'voltage depressions' call them what you will. He finds with nicad batteries used in many domestic appliances, that it is necessary, at least occasionally, to discharge the batteries deeply before recharging. Otherwise the batteries power the equipment only for much reduced times. What he feels may contribute to this effect is that the factory-made chargers supplied for nicad charging are virtually never true constant-current units but instead are normally similar to those intended for charging lead-acid batteries.

There can be little doubt that over-charging, often in the form of continuous trickle charging, can much reduce the life and efficiency of both lead-acid and nicad batteries. Doug Eaton believes that even the commonly accepted nicad charging rate of 0.1C (where C is the nominal capacity of the battery in ampere-hours (Ah)) is too high a rate for long-term charging of nicads (some sophisticated fast-charge units for broadcast applications charge at much higher rates than 0.1C but take precautions against over-charging). He found that the charger for his first Texas Instruments LED-display calculator would heat the battery up after only four hours on charge. As AG6K pointed out (77, December 1988, p957) unless the cell temperature is maintained during charging below 35°C, (a very modest rise on a warm summer day) the battery won't last long.

Doug Eaton finds that some appliance manufacturers consider it safe to leave batteries continuously under trickle charge at up to 0.1C and then to completely discharge the batteries once or

twice a year. His own solution is to change automatically the continuous charge current to about 0.01-0.02C by means of a timer after charging the unit for the first seven hours after it is returned to the charger after use. Fig 3 shows an updated circuit now used to provide such a charger. The 4060 is connected as a 7-8 hour monostable, the oscillator being inhibited when the last output (Q14) goes to a logic '1'. This causes the BC213 transistor and the BUZ11 FET to turn off, leaving R_z to set the long term charging current. The 4060 is triggered whenever the hand-held part is removed from the charging cradle. Thus removing the hand-held part allows the output voltage to rise to 11-12 volts. This turns on the 8.2V zener diode during the 50Hz-rate voltage peaks, and, via the other BC213 transistor, resets the 4060 counter and thus restarts the monostable action.

The two BC183 transistors and associated circuitry form a simple oscillator that flashes the LED in the hand-held unit once every two seconds to show that everything is working correctly after the monostable times out. It does this by restoring the charging current to its 0.1C value for 7-8% of the time. The flash rate and duration are controlled by R_y and R_x respectively. The total long term charging current is thus the sum of two currents, a continuous component (controlled by R_z) and an intermittent component (timing controlled by R_x and R_y).

Doug Eaton (28 Combermere Road, St Leonards on Sea, E. Sussex, TN38 0RS) would be interested to have comments on the optimum values for the various parameters (times, charging currents etc) with such a circuit. The values shown in Fig 3 reflect his own thoughts. He points out that the 'flash' oscillator is a very useful design, very well suited to a number of low-current applications, including medical electronic aids, since it offers significantly lower quiescent battery consumption than most other arrangements.

Dr Roy Hill, GM0IJF comments on some recent 77 items in regard to the use of vehicle batteries to supply transceivers, etc. He points out that it is not the very high peak currents, lasting milliseconds, that result in under-powering equipment but the average current of say ten amps or so lasting seconds which causes polarization and a fall in battery voltage. He writes: "In my experience even

a large truck battery will not hold up to 12V if you try to run 100W SSB from it, the voltage soon dropping to about 11.5V resulting in the rig not operating correctly." He also notes that while an ammeter is handy for checking transmitter current, it can introduce an undesirable voltage drop. To overcome this problem he uses one of the supply leads as a shunt for a sensitive meter which then needs to be calibrated.

GM0IJF, on other topics, points to a slip of my pen in referring (77, May) to 'non-ionized' rather than 'non-ionizing' electromagnetic radiation. *Mea culpa*. Unlike X-rays and nuclear radiation etc, RF radiation is not powerful enough to eject electrons from biological or other matter!

TUNING THE 11ARZ LOOP

Dick Kelsall, G4FM recently moved from a farmhouse where he had had plenty of unrestricted space for antennas into an old cottage in the village with limited room for antennas and what there is tending to be screened by other cottages. This has encouraged him to build a 1.2m diameter 11ARZ-type loop antenna (*RadCom* February) using 22mm copper pipe and covering the 7, 10 and 14MHz bands. This has proved very satisfactory when mounted at a height of only 2m above ground. The experience has, however, indicated some ways of facilitating remote tuning which could be of interest to anyone building one of these transmitting loops. He writes:

"Covering three bands makes it necessary to have some visual indication of the angular position of the tuning capacitor when changing bands. I used a simple 15k wire-wound Colvern potentiometer coupled to the shaft of the tuning capacitor, having first removed the end-stop pin from the shaft. This is fed from the 24V DC supply used for the tuning motor. The output from the wiper arm feeds a DC voltmeter through a trimming resistance to set the scale. I found it better to off-set the meter below zero to keep the wiper arm of the potentiometer away from the end of the track for zero indication on the meter.

"A stabilised supply would result in improved accuracy of indication but as the tuning is so very sharp, I found it better to introduce a phase detector into the co-ax feed to show which way to drive the tuning capacitor when within the bands, since the potentiometer indicator cannot discriminate this with sufficient accuracy. The circuit arrangement I used (Fig 4) is a simple one made from an old SWR meter.

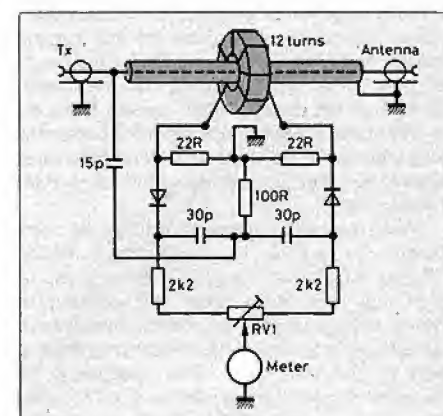


Fig 4. Phase detector for use with 11ARZ loop aerial.

"Good matching has been achieved on all three bands, better than 1.2:1 at resonance. Bandwidths for an SWR of 1.5:1 are: 7MHz \pm 3kHz; 10.1MHz \pm 7kHz; and 14MHz \pm 12kHz. I'm sure cleverer people may have better ideas but with these two additions to the system described by IARZ, I have found the loop easy to use. Neighbours are unconcerned and believe I'm on satellite TV!

"Over 36 contacts with Europe, Australia and the USA I have compared performance on reception with a Butternut HF6V elevated at 35ft with the loop axis on SW/NE. Noting the plus or minus 'S' points relative to the Butternut, the average indicated that the loop performed equally as well. Many stations were a few points better than the omnidirectional Butternut antenna.

"The tuning motor is an ex-Luftwaffe 24V PM DC motor with 25mm diameter by 50mm long together with two stages of worm reduction from the same 50-year-old source — beautiful workmanship. Having a 12-0-12V secondary on the transformer feeding the bridge rectifier for the motor supply, I was able to introduce a change-over switch to give 12V for fine tuning. I hope my experience may help others trying this interesting small antenna."

BROADBAND TRANSMITTER NOISE

The problem of spurious emissions from transmitters, including harmonics, mixer products, intermodulation distortion, is universally recognised and methods of minimising them well-publicised, if not always heeded. Similarly it is usually appreciated that oscillator phase noise, particularly from low-cost frequency synthesisers, adversely affects transmission as well as reception.

Now Edmund Ramm, DK3UZ draws attention to a form of unwanted broadband noise that can adversely affect local amateurs yet is seldom discussed, virtually never in practice considered, despite the fact that on VHF/UHF bands it can significantly degrade weak signal reception at distances up to several kilometres from the transmitter.

DK3UZ writes, "With the advent of solid state VHF transmitters, it has become fashionable to align all stages of a transmitter so that the output power remains stable across the entire band without retuning. This means that a transistorised amateur VHF transmitter represents a broadband high-gain amplifier from the first to the final stage. Clearly, as for any receiver, the noise generated in an early stage will be amplified by all subsequent stages so that the noise from the first stage is crucial. Amplified noise, across the full bandwidth of the amplifier, will be radiated from the antenna along with the desired signal, spread thinly but evenly across the band. Whenever the transmitter is operating, the radiated noise will raise the noise floor of any sensitive receiver within range of the radiated noise.

"While this sad fact has occasionally been noted before, for example by Ari Dogteram, PA0EZ (*Dubus-magazin*, 4/87 pp352-4) there is still no sign that it is being taken into account by designers, professional or amateur. Should we be designing our VHF/UHF transmitter amplifiers, as well as the front-ends of our receivers, for minimum noise? I wonder whether any TT readers can throw some further light on this problem?"

Personally, as an HF operator, the only time I recall encountering the problem of transmitter

GRAY-LINE GLOBES

Almost twenty years ago, I included in *77* (later *ART*) a table giving approximate local times of sunrise and sunset for different parts of the globe (taken from R. Keen's classic book on *Wireless Direction Finding*) together with some small maps indicating seasonal variations in 'twilight' paths. The information was intended to help readers to ascertain the most likely times at which HF signals would be subject to long-distance chordal hop propagation. Later, others gave to these twilight paths, highly favourable for DX contacts on the lower-frequency MF/HF bands (1.8, 3.5 and 7MHz), the term 'gray-line propagation'. Chordal-hop propagation had by then been put forward as the explanation of the strength and regularity of the reception of European signals in Australia by Hans Albrecht, VK3AHH/DL3EC and enthusiastically endorsed by Les Moxon, G6XN.

It was the publication in the late 1970s of the book *80-meter DXing* by John Devoldere, ON4UN that provided a stimulus to the use of gray-line propagation as well as much useful advice on 3.5MHz antennas etc. K6UA and W6NLZ, in an article in *CQ* (September 1975) seem to have originated the term 'gray-line' rather than 'twilight' paths.

Colin Horrabin, G3SBI writes: "Ever since I read ON4UN's excellent book I have been looking out for one of these 'Gray Line' globes. They are, in fact, Columbus Verlag 'Planet Earth' globes. They are internally illuminated to show darkness, sunlight and three twilight zones. There is a date control, and the globe can be used to predict the possibility of long-distance paths on the lower frequency bands. I have used my globe to check contacts made on 1.8MHz with VK6 and 9M2. In each case signals peaked when the first twilight ring before dawn in VK and 9M2 fell across the position of the stations. I have also checked other DX contacts on 7 and 3.5MHz and find a good degree of correlation, including where the distant station is experiencing dusk.

"After a number of enquiries I found that the 'Planet Earth' globes can be obtained from Edward Stanford Ltd, 12 Long Acre, London WC2. They are not cheap but I am convinced that anyone really serious about low-HF DXing should think about investing in one. They are made to high standards of accuracy and look quite attractive.

Size 1. 10.5-in diameter. This model does not have a ring round the equator so the time has to be read from the disc at the top of the globe. Price (inc VAT) £69.95, postage £3.50.

Size 2. 13.5-in diameter as used by ON4UN and with a ring around the equator for reading the time of day. Price (inc VAT) £129.95, postage £3.50.

noise was many years ago when, for a time, I worked full break-in without the use of relays, with oscillator keying and the final Class C power amplifier biased partly from grid current so that there was appreciable standing current in the key-up position. Under these circumstances the noise radiated from the transmitter with the key-up, centred on the frequency in use, was sufficient to spoil reception of all but the strongest signals. In my case, the problem was solved simply by increasing the standing bias on the PA to beyond cut-off. This, however, is not a solution for the type of situation that DK3UZ has in mind since it is noise radiation while the PA is functioning that causes the problem.

In *Dubus*, PA0EZ presents calculations based on a good 100watt 430MHz transmitter showing that its wideband noise could raise the noise floor of a sensitive receiver 5km distant from -137dBm to -117dBm, representing an increase of 18dB (three S points) in the noise floor. His main conclusion is that "stations going portable, expose themselves to very high requirements if they are not to destroy the pleasure of nearby stations (and vice versa). The main effort should be to create an output level at the last narrowband filter in the transmitter which is as high as possible. One solution could be extra amplification between the modulator (mixer) and the filter, lowering the gain after the filter by the same amount. (One would need to take care that a crystal filter is not driven into non-linearity — G3VA). A filter output level of 0dBm can be aimed at. The first transistor after the filter should be a very low-noise device. An FET would be a good choice taking into account the impedance levels concerned in such a change. For stations using a transceiver with a common transmit-receive filter, there are clearly some disadvantages in this proposed solution since the noise levels around the filter would not be well suited to the conflicting requirements of reception and transmission."

PA0EZ also suggested that transmitter noise should be at least 90dB below signal output and outlined how this could be checked. He added: "To check whether the noise created in your receiver is due to a local transmitter or your own transmitter, ask the other amateur to transmit without speech or carrier and to switch his transmitter on and off. If you do not see his switching influencing your receiver noise level when tuned about 500kHz away from his frequency, then his wideband noise is not the source of your problem."

Edmund Ramm, DK3UZ (Postfach 1338, D-2358 Kaltenkirchen, FRG) comments that changing to FET rather than bipolar devices could come close to involving a major rebuild and believes there must be simpler solutions using low-noise bipolar devices. He would welcome comment and suggestions from those with more fundamental design knowledge.

AIRCRAFT-ENHANCED PROPAGATION DEBATE

In 1985 two Australian amateurs, Doug McArthur, VK3UM and Gordon McDonald, VK2ZAB were engaged in investigating the use of forward-scatter as mode of propagation of VHF/UHF signals between Melbourne and Sydney. They were surprised at times to hear strong, but short-lived signals from Ian Cowan, VK1BG near Canberra, a distance of about 450km. The signals lasted from just a few minutes to tens of minutes and were clearly not due to meteor scatter. Careful observations and enquiries soon showed that these 'openings' coincided with the flight of large aircraft between Melbourne and Sydney.

The connection between the signals and aircraft was quickly confirmed by a number of other Australian enthusiasts and there is no dispute that this is a form of aircraft-enhanced propagation. But ever since 1985, there has been a continuing and lively debate about the cause: one faction led by Gordon McDonald believes that it can be explained fully as a form of bilateral radar brought about by direct reflections (scattering) from the metal surfaces of large aircraft. Others, including VK1BG and Roger Harrison, VK2ZTB believe that

an important factor is the large amount of hot gases ejected from the engines.

Ian Cowan, VK1BG in the latest of a number of articles on AE propagation (*Amateur Radio* (VK), March 1989, pp18-20) argues strongly that it is not only a matter of reflection of signals from the metal surfaces but "there is also a mode of hot gas supported propagation that gives very good results indeed when the conditions are right." He is convinced that an aircraft can produce what in effect is a temporary temperature-inversion. He lists the following circumstances in which such AE can occur:

- (a) A baseline distance of about 450km.
- (b) Air reasonably still and stable (ie, where pilots do not report turbulence or strong winds).
- (c) VHF/UHF terrestrial propagation is normal (ie natural big temperature inversions are unhelpful to AE, although of course desirable for conventional forms of tropospheric propagation).
- (d) The aircraft track is nearly parallel to the radio-wave path and the intersection of the two is roughly the mid-point of the radio path.
- (e) Both stations have line-of-sight paths to the aircraft.
- (f) Both stations have SSB (or CW) equipment, with 20watts or more transmitter output power, reasonable antenna gain and low-noise receiver pre-amplifiers (or first signal amplifiers). The mode can work on FM, but the average FM-operator generally lacks the necessary ERP and receiver sensitivity.

VK1BG considers that it can be shown that a large aircraft delivers a large amount of heat to the atmosphere with the geometric shape of its wake very much like a two-dimensional copy of the

temperature inversions produced in nature and which provide so many openings for serious VHF/UHF operators.

His article is thus a fairly convincing rebuttal of the view advanced by VK2ZAB (*Amateur Radio*, February 1986) that reflection from the metallic skin of an aircraft fully accounts for the AE mode of propagation. Those with reasonably long memories may recall a fascinating three-part article by Rev Paul Sollom, OSB, G3BGL (*RadCom* December 1970, January & February 1971) under the deliberately intriguing title "Flare-spot — a radio-detective story in three parts." G3BGL in conjunction with the Radio & Space Research Station (now part of the Rutherford-Appleton Laboratory) carried out an intensive investigation into the phenomenon of "steam-train (chuff-chuff) fading" on VHF/FM broadcast signals and showed conclusively that the cause was reflections from aircraft. At Douai Abbey near Reading, he recorded the TV-sound transmissions from Lille (174.1MHz, 5kW) over a path length of about 280km, relating them to the records of the London Air Traffic Control Centre. The incoming signals were spectrum analysed and the fading frequencies automatically measured. The *RadCom* articles showed very clearly the temporary signal enhancements from aircraft.

Although G3BGL was primarily interested in the effect of aircraft as a fade and interference producing mechanism, he did conclude that as a communications mechanism "the air traffic density in south-east England (in 1970) is probably sufficient to provide a reliable service by passive reflection, given adequate information on the whereabouts of the aircraft and suitable antenna

equipment at the terminals." The Doppler shifts he recorded indicated that the signals were reflected from a moving aircraft. He does not appear to have observed or considered the possibility of aircraft giving rise to temporary temperature-inversions. If VK1BG is correct in his belief that this can occur in some circumstances, the Australian work would seem to be breaking interesting new ground.

MORSE VERSUS AMTOR

Garry Orford, G4FRO takes issue with a comment I made in "The way we listen" (77, June 1989, p36). He writes: "Your contentious statement that 'hand-speed Morse is... the simplest and most effective weak signal communications mode cannot be allowed to remain unchallenged. Simple maybe but most effective? Many think otherwise. Let me quote from G3PLX in *RadCom* June/July 1980: 'Experience of the use of Amtor system by the author and others, both on HF and VHF bands, indicates that under typically bad conditions of fading and interference, Amtor (Mode A) performs better than any other mode of transmission currently used by amateurs, including morse code'. Or from G3OSS in *Buyer's Guide to Amateur Radio*: 'Amtor... I had one remarkable contact for over an hour with an Australian amateur with very few errors in conditions that would have been impossible for SSB, and exceptionally difficult with CW.' I believe G3PLX is correct and have duplicated the G3OSS VK feat with ease with a typical suburban amateur set-up. Morse has its uses but this does not give it unique mystical powers. Amtor must be considered for the title of most effective amateur mode."

CONVERTERS AND COMPONENTS

77 (January 1989) showed how a single Signetics/Philips NE602 IC could be used to form a very simple crystal-controlled HF or VHF converter. Since then some readers have mentioned that they have had difficulty in obtaining these devices, although others have found that they are available (as mentioned in connection with the low-cost spectrum analyser last year) through some of the specialised chip shops. The problem of publishing circuits using other than the most commonly available components is touched upon in a letter from Stephen Gilbert, G3OAG below. However an alternative one-device band-converter using just one common-type mosfet is outlined by AK7M in a recent *QST*: Fig 5. This was based on design in the Japanese *CQ Ham Radio* and features the use of a drain trap tuned to the crystal frequency (L1/82pF). It could prove a little more tricky to get to work than the NE602 and would not represent a 'state-of-the-art' front-end but could be useful in some circumstances.

On components, G3OAG writes: "The comments on the G4DTC receiver in June 77 prompt me to point out that the SL623 chip is readily available from Quarndon Electronics in Derby whose address was published in a *RadCom* article about component suppliers a few years ago. This is a very helpful company who can offer the data sheets and specifications on the devices they supply. I have built the back-end of G4DTC's design with some modifications. Although I have used double-sided PCB, with good by-passing and screening,

with the top as a ground-plane, I find the 623 can still be extremely unstable. Good supply bypassing is essential with plenty of capacity right at the chip pins in order to stop low-frequency instability. I feel that replacing the 10k trimpot by a 1.5k fixed resistor (as suggested in the data sheet) would probably reduce the time spent trying to tame the 623... I have also modified the S-meter circuitry and added a series choke (330 μ H) in the SL1612 IF amplifier AGC rail, right against the pins to prevent some desensitising of the IF chain when the BFO is switched on.

"Usually I loathe using specialised chips such

as the 623 which is available from only a few suppliers and I am puzzled that G4DTC picked on this device... Have you noticed the increase in the cost of basic RF components such as coil formers? Apart from the usual difficulty in obtaining a choice of RF components locally, prices have shot up. A simple plastic coil former obtainable for about 10p not long ago is now around 25p. Add to that the cost of the slug and screening can and you are up to the cost of a ready wound component (if you can get it) from say Cirkit at around 65p. For my present project I need 33 coils for the seven input bandpass filters plus a lot of capacitors...

"I note that nearly all technical and constructional articles appearing in *RadCom* and elsewhere are from amateurs holding the older licences. Could it be that the newer licensees never build anything at all (as some suspect) and are not really all that interested in electronics, as opposed to communication? Articles specifying obscure chips and components do not help. While here in Manchester we are blessed with both a Maplin and an Electrovalue, and there are good mail order services such as STC and Electromail, and of course Cirkit, there is still a problem in obtaining specialised RF components for those of us who have no connection with the electronics industry. I am a retail pharmacist and all my electronic interest stems from the 1960s when everything I had was home brew. I have to trek around the Rallies and search for bits and pieces!" G3OAG also included some notes on building the crystal ladder filter for the G4DTC receiver which I will try and squeeze in another month.

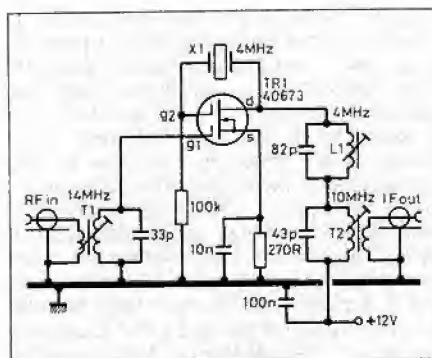


Fig 5: Single MOSFET 14-to-10MHz band converter based by AK7M on a *CQ Ham Radio* design. L1 is slug-tuned coil set to approximately 19.3 μ H. T1 slug-tuned coil about 3.9 μ H (primary three turns of No 26 enam wire over "earthy" end of secondary). T2 slug-tuned coil about 5.9 μ H (secondary four turns of enam wire over "earthy" end of primary).

Considered perhaps, but surely rejected. I have no wish to cross swords with either G3PLX or G3OSS, though I believe that G4FRO is wrong on solid technical grounds, without the need to ascribe mystical powers to Morse code! Certainly Amtor has proved a far more effective communications mode than basic radioteletyping with simple frequency-shift-keying without any form of 'automatic request for repetition' (ARQ).

Historically the 5-unit Murray RTTY code was developed for line communication and the difficulties experienced with it on HF radio circuits soon led to the introduction of the seven-unit RCA ARQ code and then to various forms of forward error correction (FEC) for use where a return link was not available. Both these systems were well-established before the development of computer codes such as ASCII, and throughout the period 1945-1965 much effort was put into developing systems more resistant to the effects of fading, multipath and interference. For fixed point-to-point services diversity reception was considered virtually essential for RTTY. For less ambitious installations, a number of multi-tone systems were developed including various 'marks' of Piccolo used by the British Foreign Office to overcome the growing shortage of experienced manual operators. Piccolo and similar systems are capable of extremely good weak signal communications though at the cost of using more bandwidth, as well as requiring extremely good frequency stability and complexity. For passing traffic rather than conventional amateur contacts, it would be possible to argue that Piccolo outperforms manual Morse, but amateurs have never shown any interest in the more complex multi-tone transmission systems.

Then again, since about 1982, the Admiralty Research Establishment has been developing the complex slow-speed frequency and time-division diversity modem using 7-unit ASCII machine code reported in *TT*, May 1985, p356 and March 1989 p38 using ten 100-baud channels on SSB to provide a single 10-baud throughput. It was claimed at an IEE Conference in 1985 that trials had shown that this modem was capable of providing the Royal Navy with a fall-back system performance equivalent to or better than that of an experienced manual operator. In the subsequent discussion period I pointed out without being challenged that the trials methodology gave no scope to the flexibility possible with manual operating. Perhaps G4FRO might consider why if AMTOR (or its professional equivalent protocol SITOR) were really better in difficult conditions than manual CW, the Royal Navy should have gone to the trouble of developing this unique slow-speed modem in its wish not to have to train morse radio operators? FSK, even in Amtor form, remains extremely vulnerable to multipath conditions. I wonder if he finds his AMTOR set-up as reliable as manual CW on, say, the trans-Arctic path to Alaska as he apparently does on the UK-Australia path where the chordal-hop paths are usually relatively free of multipath and fast fading?

The manual operator can readily adjust his speed to suit path conditions, repeat key words, shift frequency to minimise interference, adjust the bandwidth of his receiver to optimise signal-to-noise ratio, use language-redundancy and intelligent guesswork to fill in gaps and correct errors (the fact that Morse is not a fixed time-unit-per-letter code can assist this process). The normal amateur contact is not concerned with achieving a high throughput of traffic but with the

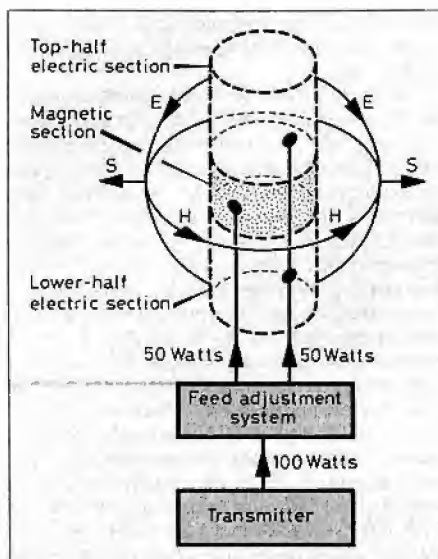


Fig 6. Basic configuration of the GM3HAT/GM3TDI controversial 'crossed-field antenna'. Does it really work by direct synthesis of the Poynting Vector cross product?

exchange of what, in difficult conditions, is reduced to: signal report, QTH, name, etc. Machine and electronic telegraphy can be made to cope with poor signals by means of complex signal processing and by reducing the speed of transmission; just as CW can be further improved by adopting coherent techniques, although this is seldom attempted in practice. Not just for nostalgic reasons I stick by my claim that manual Morse is not only the simplest but also the most effective weak signal communications mode for amateur radio: Amtor represents a major advance on conventional HF RTTY but lacks the flexibility achievable with human decoding and the electronic sophistication of some of the more recent adaptive systems of data transmission.

The 'boom' technology of packet radio is spectrum-efficient but unfortunately is all too vulnerable to interference. There is a considerable body of opinion that doubts whether its use should be encouraged or is really feasible on crowded HF bands. While it is important that amateurs should advocate an experimental approach to new technology, one has to recognise that some systems are likely to upset existing operators, giving rise to such protests as that delivered by John Shelley, WA1IAQ in *Ham Radio*, June 1989: "An electronic plague has descended upon Amateur Radio. Long-standing nets and discussion groups have been pushed out of existence by the agonizing, screeching tide of packet radio... Who can stand that piercing sound that has been likened to that of fingernails on a blackboard?... The basic pleasures of hearing a voice from afar, sensing its emotions, its unique sounds, are being battered. It is bad enough to lose frequencies to commercial interests, but it is much worse to have them rendered unlistenable by your own group. This could be the final assault in which Amateur Radio, like all the great empires, falls from within."

'NEW' ANTENNA?

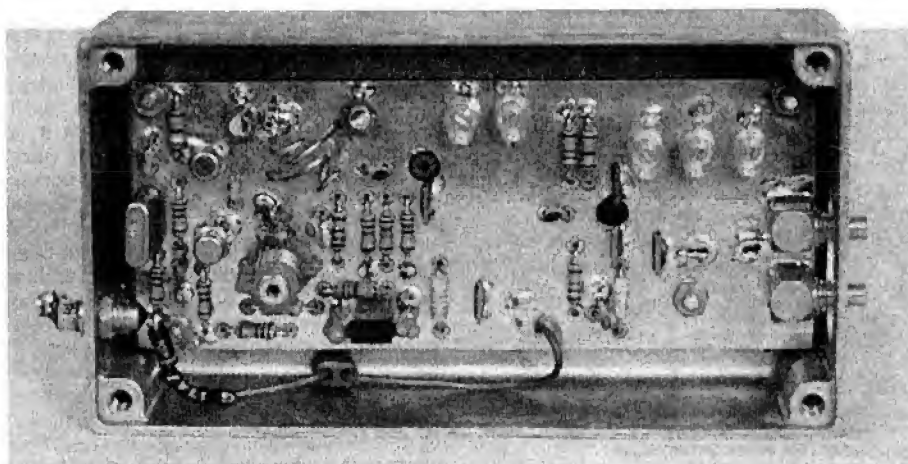
With a century of antenna development behind us, it takes some courage to claim to have developed an antenna system that depends on

doing something "for the very first time in the history of radio-communications". Indeed, anyone making such a claim has to expect that it will be received with a degree of scepticism, particularly when the system is claimed to overcome most of the disadvantages traditionally associated with electrically-short antennas.

Maurice Hatley, GM3HAT and F M Kabbary, GM3TDI have certainly stirred things up by describing their new "crossed-field antenna (CFA)" as exploiting "for the very first time, radio waves that have been efficiently generated by direct synthesis of the Poynting Vector cross product, by using separately stimulated electric and magnetic fields cutting at right angles." In effect they claim that reversing the form of Maxwell's original equations has led to the realisation and development of a revolutionary new antenna system (Fig 6) for which they have applied for patents in a number of countries and are marketing through Hatley Antenna Technology, the firm associated with GM3HAT's dipole of delight!

An article (with B G Stewart) "Maxwell's equations and the crossed-field antenna" appeared in the March issue of *Electronics & Wireless World* that I for one found virtually impossible to understand and which has since been savaged by a number of antenna specialists including Dr A G P Boswell, G3NOQ, who points out: "The value or otherwise of the CFA could be very quickly established by an experiment conducted by any generally-accepted method. The radiated field produced at some large distance from the antenna should be measured and related to the RF power being fed to the antenna terminals. The *IEEE Standard Test Procedure for Antennas* (IEEE Std 149-179) offers one such procedure by which the authors could (maybe) silence their critics immediately. Can they explain why this has not been done? Until it is, the verdict on the CFA must remain 'not proven'." Others have suggested the article was an April Fool article published a month too soon! My own ill-informed opinion is that it rather proves that if you can feed RF to any lump of metal in the sky it will radiate effectively on HF in good conditions. It may well be advisable to wait for the results of a carefully controlled test before accepting that GM3HAT and GM3TDI are really generating radio waves in a unique and revolutionary manner, despite their claim that many prototypes smaller than 1m in height and 0.4m in diameter have been tested and have radiated any frequency from 1.8 to 30MHz at powers up to 400W with the only adjustment necessary to change the wavelength generated is a change of proportional feed voltage and phase to the two field-stimulating electrodes. Wonderful, if it really works as claimed and in the manner claimed! Meanwhile they have certainly blinded me with science and Maxwell's equations.

Gary Milton, G0CUQ provides a cautionary tale for owners of FT-747GX HF transceivers and possibly also relating to some other equipments. On the rear of the FT747 is a socket which provides 13.8V for powering keyers etc. The manual points out that it is intended only for supplying loads of a few hundred mA. G0CUQ was unlucky enough to fit a homebrew connector to this socket which proved to have a short-circuit between the power rail and 0V. This resulted in excessive current which burnt the 13.8V supply track off the PCB. Too late he realised that this supply is not separately fused. He warns readers to check carefully any connectors, accessories etc for short-circuits before plugging into the rear panel socket. It could save them a nasty repair bill.



Making microwaves work

Mike Dixon, G3PFR, takes the mystery out of home-brew microwaves and introduces the Microwaves Committee Component Service.

There is considerable current interest in simple, low power but effective equipment for the lower microwave bands, particularly 1.3GHz (23cm) and 2.3GHz (13cm). Newer uses are centred on packet (fixed links), 'personal' beacons and control, all allowed under the new licence conditions.

It is sometimes assumed, since there are now (albeit expensive) black boxes for 1.3GHz and some kits for 2.3GHz, that the techniques of construction and operating are simply an extension of the practices on the lower VHF/UHF bands. This is manifestly an incorrect view, judging by some of the apparent 'difficulties' encountered by some builders of the well-known G4DDK001 oscillator/multiplier board [1] and the matching G4DDK002 1W linear amplifier [2]. Both these designs cover quite a wide frequency range — 1100 to 1300MHz — which makes them suitable for the purposes outlined above and, indeed, the newcomer to microwaves or the student licensee. Some of these uses are illustrated in Fig 1.

In view of this interest and the versatility of the designs, I thought that a review of the do's and don'ts of microwave construction might be appropriate, especially since some constructors appear to have trouble in making the designs work to specification.

PCB MATERIALS AND PRINTED CIRCUIT BOARDS

You are strongly recommended to use the professionally produced boards available through the Microwaves Committee Components Service. This is because the quality of board material and the accuracy of etching (particularly the printed inductors which form the resonant tuned lines and filters) can dramatically affect the performance of the finished equipment. Epoxy/glass board is usable, with care, to about 2.5 or 3GHz. Beyond this it is almost essential to use PTFE/glass board. The boards supplied are fully drilled, slotted and tinned, ready for use.

If you decide to make your own PCB's, then you must use a high quality 1.6mm double-clad board. The copper cladding should be '1 ounce'. It is useless to think of using cheap material whose characteristics, for example dielectric constant, are unknown and may vary from piece to piece or even within one piece. Photosensitised board from a good source is quite satisfactory, or you may sensitise your own by using an aerosol sensitizer.

To produce etching masks, use copying methods which ensure *exact* (100%) dimensions: some photocopiers don't copy exactly to size! This is particularly important where the length and width of the tracks is critical to determining their impedance or resonant frequency. Instead of trying to etch clearance holes in the upper groundplane by using double masking, it is easier for the home constructor to clear away the copper by using a small drill-bit, twisted between the fingers, to remove a small circle of copper around the hole.

Slots, where needed, can be cut by drilling a series of *small* holes and then joining these by sawing with a piece of broken hacksaw blade ground thin (say 1mm) and pointed as in Fig 2. With care, you can produce quite neat slots, don't make them so long and wide that the leadless trapezoidal capacitors fall through before they are soldered in place! Grounding strips (copper foil, often obtainable at model shops) for the microstrip lines should be fitted as close to the end of the line as possible, otherwise you may lengthen the lines (and lower their resonant frequency) without realising it — then the maximum frequency covered may be below what you expect!

Before you use the board you have just made, make sure that you have removed all the burrs and swarf caused by drilling and slotting. Clean the surface well to remove fingerprints and grease, otherwise you may find it difficult to solder. This applies to the track side and the groundplane side. The best way to clean it up is to use a fine, wet, soap-loaded steel or brass 'pan-scrub'. The surfaces should be rubbed gently until they are clean, the board washed off with fresh water and then thoroughly dried. Don't touch the board again with naked fingers or you'll undo the benefits of cleaning!

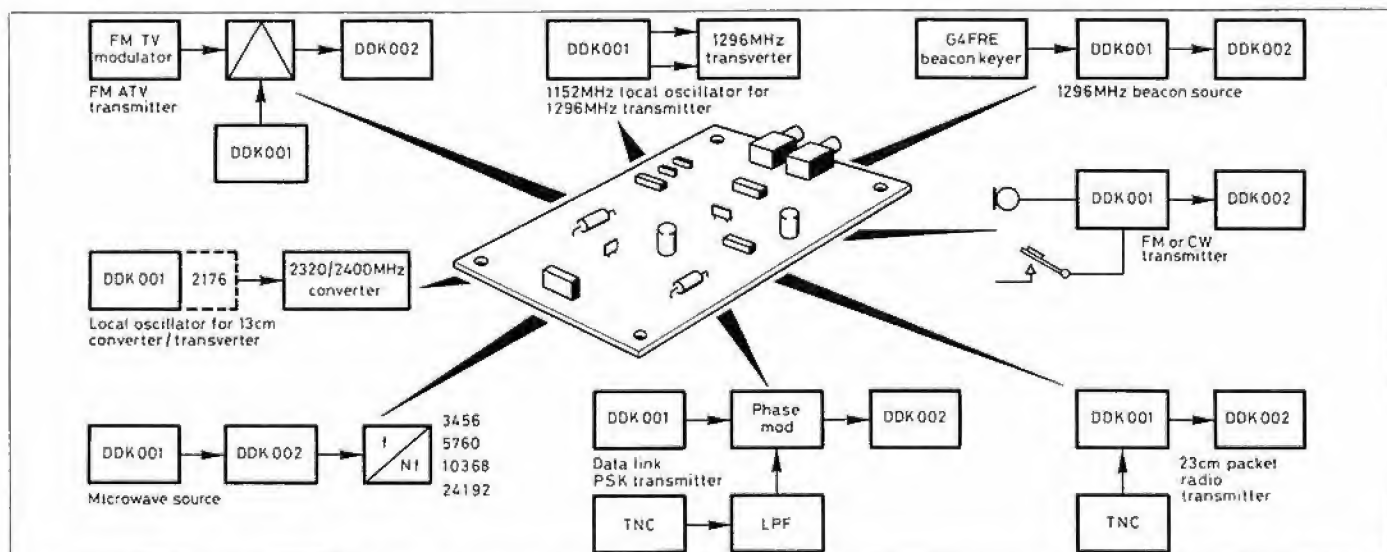


Fig 1. Some of the possible permutations using the DDK001 (oscillator/multiplier) and DDK002 (1W linear amplifier) boards available from the Microwaves Committee Components Service

The benefit of using the prepared boards is that all this work has been done for you, as well as all-over tinning which prevents oxidation of the copper and makes soldering easier.

CHOICE OF COMPONENTS

The components chosen to assemble on the PCB are also very important. The circuits described have been repeated many times without any problems, but it is important to use *exactly the components specified*, especially the trimmer and decoupling capacitors. Don't be tempted to use unbranded 'surplus' components of any sort, especially those salvaged from the junk box!

The trimmer capacitors are particularly important in two respects: first, the minimum capacitance will determine the maximum frequency to which the lines will tune and, second, their physical size is important in determining the degree of coupling between deliberately coupled circuits, such as filters. Get these wrong and the whole thing may not work properly. So, as a general rule, use only the specified components or named alternatives — they may cost coppers more, but it is money well spent. Most microwave circuits are much less forgiving than their lower frequency 'lumped constant' cousins at VHF or UHF and transistors are also unpredictable unless of properly branded origin.

A word or two about coaxial connectors: N-type connectors are too large and BNC connectors can be unreliable, UHF sockets *must not* be used (they are absolutely useless at UHF, despite their name, and significantly mismatched even at 144MHz) and the only really reliable types are SMA, SMB or SMC, all of which are expensive. You might like to consider taking the output away by directly connecting miniature 50ohm coaxial cable as shown in Fig 3. Do not take the output away as shown in Fig 4: this is disastrous as it will almost certainly cause mismatch, stray inductive losses and may detune the output lines so that they will not resonate properly.

HOUSINGS

It is important to house the finished PCB properly in order to screen the circuitry from stray pickup which may cause unwanted noise, modulation or instability. A degree of thermal stability will also result from using a proper housing: even crystal controlled circuits drift with changes of temperature and the degree of frequency drift is magnified by the multiplication involved to reach the final frequency.

Both the oscillator source and the amplifier boards will fit inside standard small diecast boxes and these are particularly recommended for this application. However, they are quite expensive and difficult to use. Piper Communications stock tinplate boxes of various sizes which are an acceptable substitute for the diecast boxes. These are widely used in Europe for housing such PCB's and are much less expensive. They consist of two L-shaped side pieces and top and bottom lids. It is intended that the PCB be *soldered* into the box, joining the edges of the groundplane to the sides of the box. I expect that these boxes will become more popular with the growing interest in such microwave circuits.

ORDER OF CONSTRUCTION — MECHANICAL

The order of construction is quite important in most microwave designs, where the objective is to

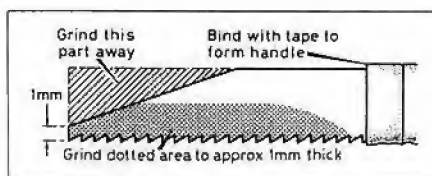


Fig 2. Grinding a hacksaw blade for slot cutting

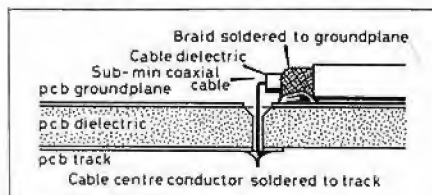


Fig 3. Correct coax connection technique

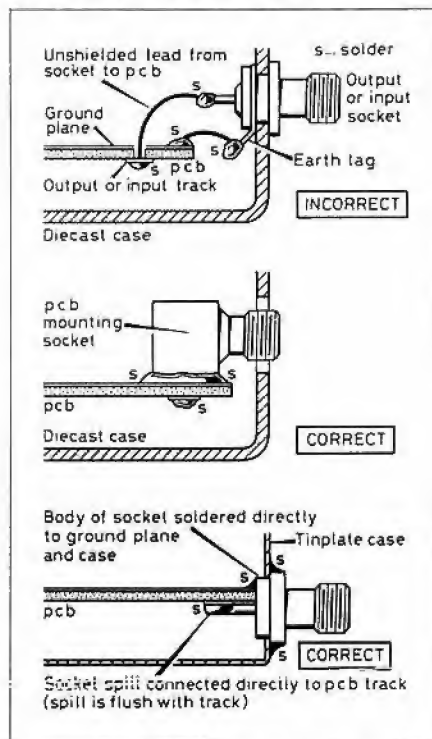


Fig 4. Correct and incorrect methods of connecting coaxial sockets to microwave PCBs

use the shortest possible lead lengths or no leads at all.

If you intend to mount the PCB within a diecast box then the first thing to do before any components are mounted on the board is to place the board flat on the bottom of the box, position it and mark the centres for the PCB mounting holes. Drill suitable holes and make sure the board will fit easily onto the mounting studs which are held in place with

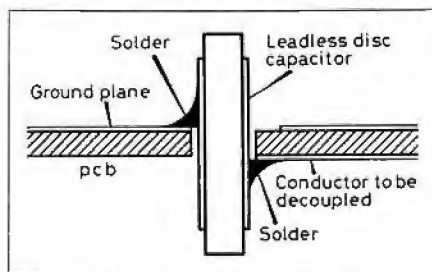


Fig 5. Installation of trapezoidal capacitors

nuts. Further nuts can be used to space the board well off the bottom of the box. Next drill any holes needed for power and modulation feedthrough/capacitors and output socket(s) or cables. You'll have to use screw-in feedthroughs, as it is impossible to solder to the diecast metal. Once you are satisfied that all the mechanical work is complete, then you can start to assemble the board.

Tinplate boxes are used as follows: the side pieces should not be soldered together at this stage. Place and hold the drilled board inside one of the L-shaped side pieces and position the board so that the top of the oscillator coil (in the case of the source board) will come about 5mm below what is to be the top of the box. Mark all round the inside of the box where the board is to be mounted (eg with a soft pencil or *lightly* with a scribe). You may have to file the edges and ends of the board slightly to make the board a snug fit in the box, especially where there is an overlap where the side pieces will be soldered together to make the box shape.

Mark the other side piece similarly. Mark and drill where the input(s) and output(s) are to go and drill holes for feedthrough capacitors (solder-in types are suitable). If you are going to use output sockets, these should be positioned so that their spills lie flush with the output pads on the PCB. Mark their position(s) and drill accordingly. One advantage of the tinplate box is that you can easily get at the underside of the mounted board, making it possible to use ordinary panel-mounting sockets in this way, rather than the right-angled PCB-mounting sockets which need to be used with a diecast box to avoid unscreened, unmatched connections between the output pad and the output socket.

ORDER OF CONSTRUCTION — ELECTRONIC

Make sure you have all the components at hand and that they are of the correct type and specification — you should be particularly careful that the right components occupy the correct board positions. Most constructional errors occur at this stage:

The other things which will be needed are a good, small soldering iron with a clean, well tinned bit and some small gauge resin cored solder. This should preferably be around 22SWG and 60% Tin, 40% Lead composition. It is useful to have a chisel ended bit and a pointed (pencil ended) bit, but not essential. Practice your soldering technique on a few scrap components before you can produce clean, bright joints quickly with the minimum heat applied to the components!

If you are using a tinplate box, carefully solder the board into one half of the box, soldering it along the groundplane, aligned along the mark you made earlier. Then solder the other half of the box in place, ensuring a snug fit. Don't forget to solder the box joints too! Now you can start soldering in the components. With a diecast box, of course, you can work directly on the board without it being mounted in its box. Fit and solder any grounding strips and sockets first. Then fit all the resistors and fixed capacitors, taking care to solder any grounded leads on both the top and bottom of the board. Resistors should be fitted flush to the board, not 'stood off', and capacitors with the absolute minimum lead length.

Next fit any wound components such as inductors and chokes. The trapezoidal decoupling capacitors must not be overheated or they may fracture. The

best way is to mount them with the short side down, soldering them to the printed line or emitter track as appropriate and the *opposite side* to the top groundplane. Make sure that the other side of the capacitor (the track side) does not short to the groundplane: check this with an Ohm-meter. The correct way of fitting them is given in Fig 5. Carefully fit the trimmer capacitors making sure that they are fitted the right way round (adjusting slot or rotor connection to ground), sitting flush on the board with minimum lead length.

Solder in transistors and IC's last, using a minimum of heat (shortest soldering time possible). The oscillator transistors *must* have their screen leads soldered to the groundplane using the minimum lead length. The flatpack transistors should fit in the mounting holes with their leads flush to the tracks. Any excess lead length should be trimmed off before soldering: make sure their orientation is correct! Similarly for the transistors on the amplifier board, not forgetting that the final amplifier transistor in this case must be heat-sunk before testing and use. Using a diecast box, the stud of the transistor may be bolted to the box bottom when the PCB is mounted in the box. If you align the board out of its box, bolt on about four square inches of $\frac{1}{8}$ " thick aluminium plate to the stud. It is difficult to use a tinplate box for the amplifier as the thin tinplate will not provide heatsinking.

A properly "engineered" and housed oscillator a multiplier source should look like the photograph on the opening page.

ALIGNMENT OF MICROWAVE CIRCUITS

As was pointed out in the original articles, alignment is best undertaken using simple test equipment in the first instance: absorption wavemeters rather than frequency counters and analogue meters rather than digital meters.

Try to follow the procedures described *exactly*: the alignment methods were as carefully thought-out as the circuits! It will pay you to acquire or make simple wavemeters covering about 90 to 600MHz in order to check that the various multiplier stages are on the correct frequency. A wavemeter and some form of simple power detector usable at the output frequency is also useful to have, some designs are given in the fourth edition of the *VHF/UHF Manual*. Calibration of wavemeters can be carried out at Microwave Round Tables and sometimes you may find suitable wavemeter-power indicators as surplus equipment at rallies.

CONCLUSIONS

Microwave construction need not be either daunting or unsuccessful, although some simple do's and don'ts should be observed, as outlined in this review. Follow the 'rules' as described in the supporting articles and you won't go far wrong!

Good luck with your construction and don't forget that members of the Microwave Committee are usually available (via RSGB HQ) to offer advice and assistance in case of difficulty. □

REFERENCES

1. 'A local oscillator source for 1152MHz', Sam Jewell, G4DDK, "Microwaves", *RadCom*, February and March, 1987.
2. 'A 1W 1152 to 1300MHz linear amplifier', Sam Jewell, G4DDK, RSGB Microwave Newsletter, 07/87 (October-November) 1987.

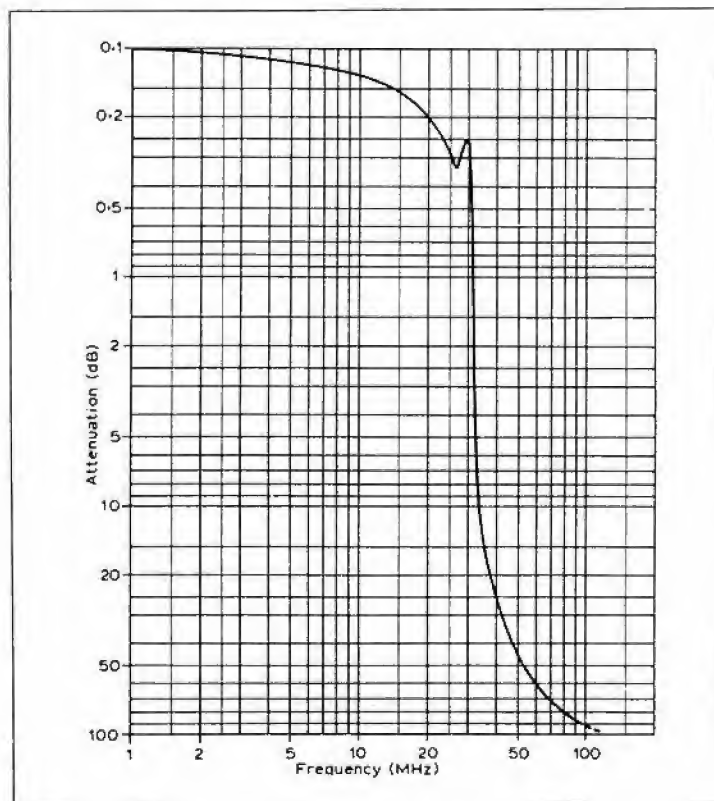
A low pass filter for HIGH power

George Eddowes, G3NOH, describes a simple and effective filter for HF QRO.

Ever since I started using a linear amplifier on the HF bands, my low pass filter has not been in the correct position in the chain of my equipment because it was made for a maximum output of about 200 watts. Recently, a complaint of slight TVI spurred me on to make a filter that would handle the full legal power, in fact the item to be described is capable of handling well over 400 watts!

The values for the components were taken from an article by 14QQE/F0BJT which appeared in *RadCom* in December 1978. The problems associated with making a filter which is capable of handling a large amount of power centre around the type of capacitor that needs to be used, together with the close tolerance that is required of it. The method employed here overcomes both of these snags and, provided one has the basic skills in using a few handtools, the design can be easily reproduced with the same characteristics as shown in the response curve. Since I designed and constructed this filter, I have been informed that the same capacitor construction was used in an age-old low-pass filter made by the 'Minimitter Company' of London.

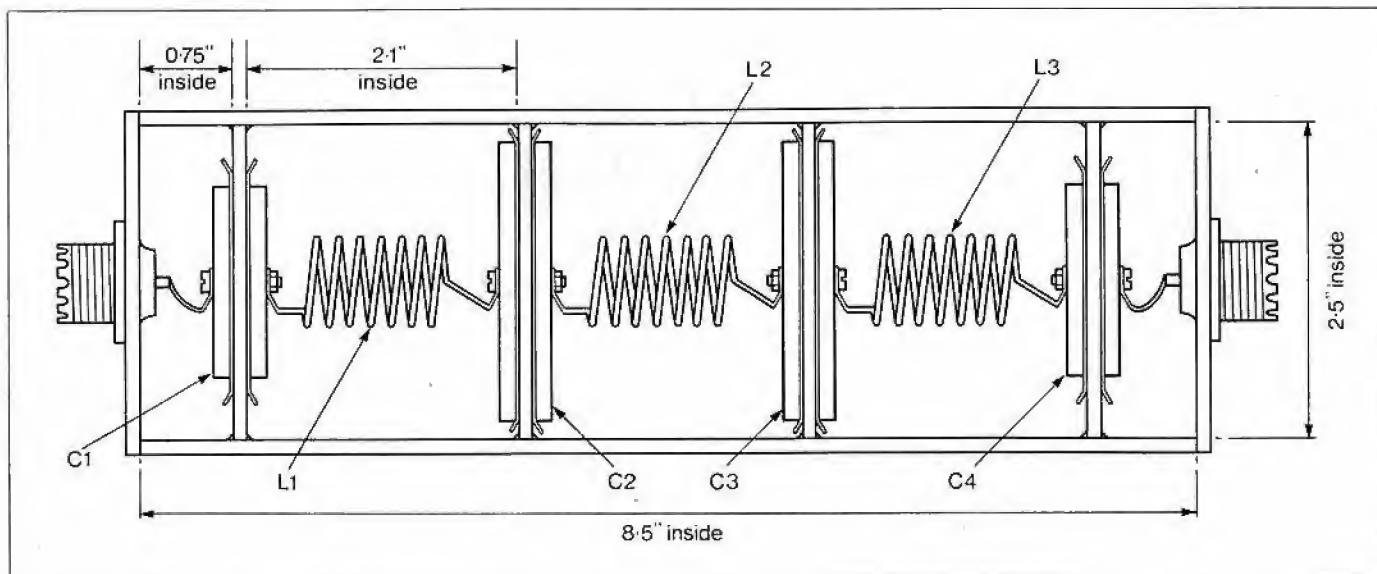
Attenuation curve of low-pass filter.



CONSTRUCTION

The housing uses 2mm double-sided copper-clad glass fibre board which makes assembly relatively easy when using a soldering iron. The capacitors are made using $\frac{1}{8}$ " dural sheet, which ensures no mechanical distortion and 10thou PTFE sheet, which provides a dielectric capable of withstanding very high voltages. Fig 1 shows the dimensions of the filter and Table 1 gives the dimensions of the component parts. Fig 2 is an exploded view of the capacitor assembly.

The end screens are drilled so as to accommodate whatever connectors are preferred by the builder. The screens are then all drilled and reamed in their centre to enable a spacer, fabricated from the inner insulation of UR67 coax cable, to make an interference fit. The spacers are cut to just under the thickness of the PCB and a No. 32 drill is used to open up the hole to clear a 6BA screw. At this point it may be worthwhile mentioning that the easy way of locating the exact centre of a screen is to draw two lines joining the opposite diagonal corners and where they intersect is the spot! Using a large drill, say $\frac{1}{2}$ " to $\frac{3}{4}$ ", and/or a



modelling knife, remove the copper from around the hole for about $\frac{1}{16}$ " and remove any burrs that may be on the edges of the boards.

Tin all the edges of all the boards for about $\frac{3}{16}$ ", taking care not to deposit too thick a layer of solder. A convenient method to ensure this is to wipe the solder while it is still molten. Remember that all the screens need to be tinned on both sides.

Assemble the base, one of the sides and the middle screen, making sure that all is square. Mount the rest of the screens working outwards from the centre but only tack the screens together at this point in case any have to be adjusted slightly. It can be very difficult to unsolder a completed joint! When you are sure that all is well, run the soldering iron, preceded by the solder, along the joints. The other side can now be offered up and, again, tacked on until you are happy with the alignment after which you can complete the joints. Unless you are extremely lucky the individual top screens will not fit, so each one has to be filed to size to make them a push fit. Solder a short length of 16 SWG wire to one face of the screen to enable it to be located (and later removed) during fitting and fixing. Round off the corners slightly so that any solder that is in the way in the corners of the box does not prevent location of the screens.

CAPACITOR PLATES

The capacitor plates should be made to a tolerance of ± 0.02 ", so this is where the use of calibrated calipers can prove very handy. The centre hole is located in the same way as the holes in the screens and drilled with a number 32 drill (6BA clearance). The plates must have all the burrs removed and the corners rounded off using a fine file or coarse glass paper. The faces are then rubbed on the glass paper until it is seen that all of the surface is in contact. Fortunately it is only necessary to carry out this nail-breaking performance on one face!

The PTFE sheet is cut $\frac{1}{16}$ " larger than the plates, four being needed for each capacitor, ie. two per plate. The centre hole is made by holding the sheet over the hole in the plate and pushing a $\frac{1}{8}$ " screwdriver through the hole, a pair of sidecutters is then used to trim off the small piece of material that remains.

Before assembly of the capacitor plates be absolutely certain that all traces of swarf and

filings are removed from the component parts as any trace of metal could cause the dielectric to break down. Wash the housing in warm soapy water, rinse and dry off thoroughly. If you intend to dry off the assembly using an oven, do please remember the low melting point of solder! The plates are fixed by $\frac{1}{2}$ " 6BA screws, nuts and shake proof washers with a solder tag on each side. Mount the inner ones first because it is then possible to reach the screw heads through the outer screens.

The coils should be made exactly in the manner described in order to obtain the correct filter response. I tried two sets of coils, one made by myself and another prepared by a friend to my instructions, both sets produced exactly the same filter characteristics. The idea of this exercise was to verify that the design could be reproduced without the need for tweaking. The formula used for the calculation of the capacitor plate sizes was taken from the *ARRL Handbook*, 1988, and is:

$$C = 0.224 \cdot k \cdot A / d$$

Where C is in pF, A is the area of one plate in square inches, d is the thickness of the dielectric in inches and k is the dielectric constant of the PTFE. Both the accuracy of the formula and my calculations were checked on an accurate bridge.

The coils are made using 16SWG tinned copper

wire by winding 9 turns on a $\frac{1}{2}$ " former, then removing the coil and running a $\frac{1}{8}$ " screwdriver through the turns. One turn is removed so that there are 8 left, at which point the length of the coil will be too large. Compress the winding using finger and thumb and the end result should be a length of 1".

The coils, L1, 2 and 3, are now soldered into place, carefully bending the solder tags to fit on the end of the winding, without compression or expansion of the coil. Before the individual top screens are soldered into position test the filter in the output of your transmitter and gradually increase the power to maximum. With a bit of luck and a following wind there will be no sparks or bangs!

If all is well, the top screens can now be soldered into position. They are inserted to a depth such that there is a sufficient strip of copper, about 1mm, to enable a run of solder to be made along the four sides. The lid is drilled with a No 60 drill in five places along each edge, about 0.4" in, and links soldered into position through the board. Offer up the lid and make any fine adjustments to the size so that it seats correctly. Using copper foil, fix the lid to the main frame in four places along each edge and one at each end. This completes the testing and construction of the filter.

Fig 1.(above) Mechanical construction of the filter.

Fig 2.(below) Plate capacitor construction detail.

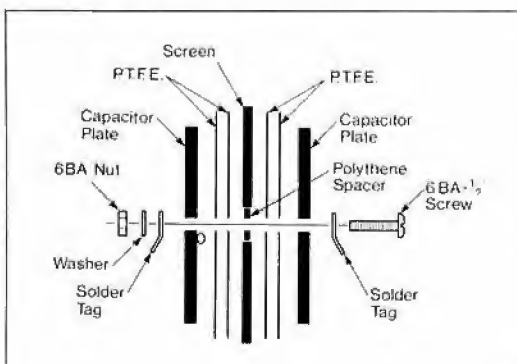


TABLE 1
(All dimensions in inches)

Base and Sides	8.5 x 2.7"
Lid	8.5 x 2.5"
Screens	2.5 x 2.5"
End Screens	2.8 x 2.7"
Top Screens (nominal)	2.6 x 2.2"
C1, 4 Plates	1.5 x 1.5 + 0.0/-0.02"
C2, 3 Plates	2.1 x 2.1 + 0.0/-0.02"
L1, 2, 3	See text

FILTER SPECIFICATION

Passband Insertion Loss	0.37dB at 29MHz
Stop-band Max Attenuation	>60dB
SWR at 14MHz	1.26:1
SWR at 29MHz	1.78:1
Rejection at 42MHz	28dB

NEW

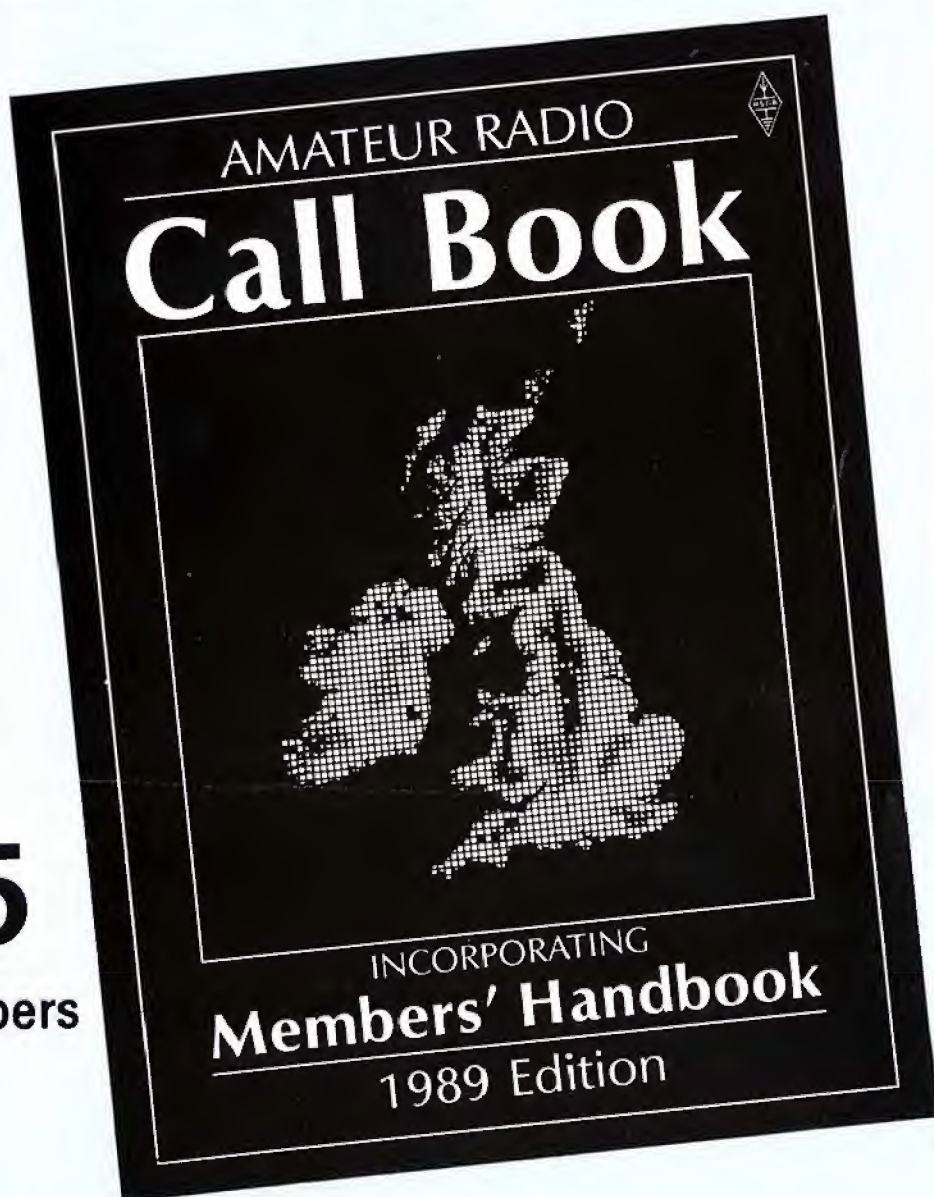
RSGB

CALL BOOK 1989

- * 60 more pages than the previous edition
- * 280 pages of call sign listings
- * 120 pages of vital information

£7.95

to RSGB members
by post



AVAILABLE NOW

DX COMPETITION — HOW TO ENTER

This month we are printing the last set of photographs and clues (see bottom of this page and front cover) relating to well-known landmarks around the world. All you have to do is identify the precise location of the landmark, write down the ITU prefix associated with the respective country and also its capital city (or main town/village in the case of islands). When you have successfully identified all locations and provided the required information, you must then estimate the total number of International Nautical Miles flown point to point by the shortest direct route (ie, ignoring the normal airline routes and availability of a local airport) if you were to visit each of the locations in the order in which they appear. The start and finish point is at RSGB Headquarters in Potters Bar. This latter part of the competition will be the tie-breaker.

For example — the photograph shows the Sydney Opera House so, if this were the first clue (which it isn't), your answer would be:



Sydney Opera House, Sydney NSW, VK(1) and Canberra. The shortest distance between RSGB HQ and Sydney is 9,166 International Nautical Miles — OK?

By the way, don't forget that you will have to add the distances between each of the locations as they appear, starting and finishing at RSGB HQ, in order to arrive at the total.

The entry form is printed opposite — all you have to do is attach the two vouchers which appeared in earlier issues of Radio Communication. These vouchers **MUST** be attached to the entry form (photocopies of the vouchers or entry form will **NOT** be accepted). The competition is open to RSGB members only and in the event of a tie, the entrant with the nearest estimated total International Nautical Miles travelled will be the winner. In the event that no entrant successfully identifies all of the locations or gives all of the required information correctly, the judges will exercise their discretion.

So - it only remains to wish you the best of luck and "GOOD DX".

RULES:

Entries **MUST** be received at RSGB Headquarters by 5pm on Friday 29 September and the judges' decision will be final.

The winner will be notified by post and the first prize of the holiday must be taken during the Winter 1989/90 season on a mutually convenient week for the winner and Serenity Holidays Ltd, excluding Christmas, the New Year and Easter holidays. If the

winner would like an additional week at the same accommodation or at another hotel in The Gambia, this can be arranged at extra cost. (It's certainly worth considering this since the air fare forms part of the prize and the cost of an extra week is, therefore, quite reasonable.)

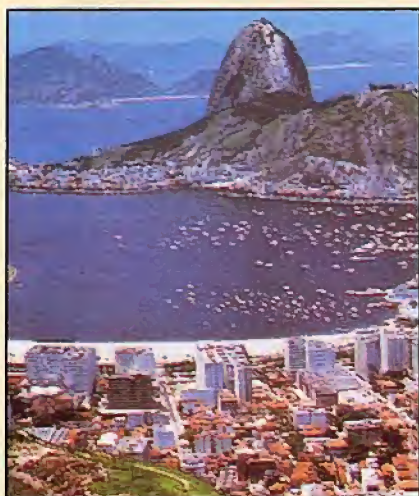
No cash alternative prize will be available.

The winner of the competition may be required to provide a write-up of his/her experiences in the Gambia for possible future publication in *Radio*

Communication and should be prepared to allow their name and photograph to be used in conjunction with any publicity resulting from winning the competition, either by the RSGB or Serenity Holidays Ltd.

Immediate family members of Mr & Mrs G E Sumption, or employees of Serenity Holidays and immediate members of their families, or employees of the RSGB, or the Council of the RSGB, and immediate members of their families, will **NOT** be eligible to enter the competition.

CLUE 7



FAMOUS CARNIVAL IS HELD HERE EACH YEAR.

CLUE 8



PLENTY OF COCONUTS WHERE THIS VESSEL MET ITS END.

CLUE 9



WHEN THIS ISLAND ERUPTED THE MINOAN CIVILISATION WAS WIPED OUT.

CLUE 10

KAROL WOJTYLA LIVES HERE
(See front cover for photo)

DX COMPETITION — HOW TO ENTER

Send your entry form, complete with the entry vouchers which appeared in this issue and in the June and July issues, (photocopies NOT acceptable) to:-

Rad Com DX Competition
Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar
Herts EN6 3JE

Entries to arrive NO LATER THAN
Friday 29 September 1989.

The winners will be notified by post and the full results, including the winners' names and callsigns/RS numbers, will be published in Radio Communication. The judges decision is final. No correspondence will be entered into.

** The Lat & Long of each location has been obtained from readily available public information.*

The distances were calculated using a widely available computer programme.

The total as calculated by RSGB will be considered as the correct total and, in the event of a tie, the nearest entry to the total will be the winning entry.

DX COMPETITION — ENTRY FORM

Name _____

Callsign/RS Number _____

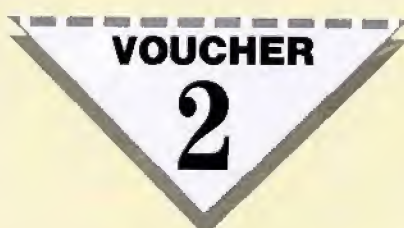
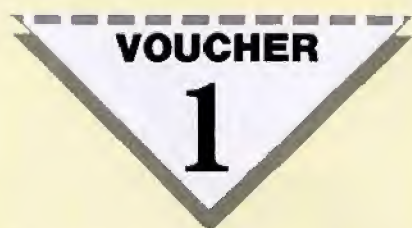
Address _____

Postcode: _____

Location in photograph	ITU Prefix	Capital	Distance between locations
1) _____	_____	_____	_____
2) _____	_____	_____	_____
3) _____	_____	_____	_____
4) _____	_____	_____	_____
5) _____	_____	_____	_____
6) _____	_____	_____	_____
7) _____	_____	_____	_____
8) _____	_____	_____	_____
9) _____	_____	_____	_____
10) _____	_____	_____	_____

Tiebreaker: The total distance between the locations listed above in the order in which they appear, starting and finishing at RSGB HQ in Potters Bar isInternational Nautical Miles.*

Attach entry vouchers here — voucher 3 is already in position.



RSGB — MAIL-ORDER PRICE LIST

RSGB BOOKS

	NON-MEMBERS	MEMBERS
Amateur Radio Awards Book (3rd Ed)	£9.35	£7.95
Amateur Radio Operating Manual (3rd Ed)	£8.84	£5.81
Callbook - RSGB 1989	£9.35	£7.95
G-QRP Club Circuit Book	£6.54	£5.56
HF Antennas for All Locations	£7.24	£6.15
Ins and Outs of Repeaters	£1.35	£1.15
Morse Code for Radio Amateurs	£3.21	£2.73
Practical Wire Antennas	£8.09	£6.88
Radio Amateurs Examination Manual (12th Ed)	£5.82	£4.95
Radio Communication Handbook Vols.1+2 (PB)	£13.82	£11.75
Radio Data Reference Book (5th Ed)	£9.59	£8.15
Teleprinter Handbook (2nd Ed) - Reduced to Clear	£2.29	£1.95
VHF/UHF Manual (4th Ed)	£10.88	£9.25
World at their Fingertips	£8.62	£7.33

RSGB MAPS CHARTS & LISTS

Great Circle DX Map (card for desk)	£0.59	£0.50
Great Circle DX Map (wall)	£3.21	£2.73
HF Awards List and Countries List	£0.54	£0.46
IARU Region 1 Beacon List	£0.44	£0.37
Locator Map of Europe (wall)	£2.17	£1.84
Locator Map of Europe (card for desk)	£0.79	£0.67
Locator Map of Western Europe (wall)	£3.40	£2.89
Meteor Scatter Data Sheets	£3.91	£3.32
Software Register	£1.18	£1.00
UK Beacon List	£0.44	£0.37
UK Repeater List	£0.56	£0.48
World Prefix Map in full colour (wall)	£3.38	£2.87

RSGB MEMBERS SUNDRIES (MEMBERS ONLY)

RSGB badge car sticker	£0.81
RSGB belt (leather)	£10.88
RSGB tie (coffee, maroon, green, blue - please state)	£4.50
RSGB teeshirts (medium, large, ex.large - please state)	£5.15
RSGB 'Green Book' (details structure, organisation and objectives of the Society)	£1.20
Standard callsign lapel badge (5 weeks delivery)	£2.95

De-luxe callsign lapel badge (5 weeks delivery)	£3.34
Standard lapel badge (RSGB emblem, pin fitting)	£1.36
Mini lapel badge (RSGB emblem, pin fitting)	£0.91
Members' headed notepaper (50 sheets) quarto	£2.81
Members' headed notepaper (50 sheets) octavo	£1.50
T & R Bulletin July 1926 souvenir copy	£0.45

RSGB LOGBOOKS

Amateur Radio Logbook	£2.65	£2.25
Mobile Logbook	£1.37	£1.16
Receiving Station Logbook	£4.46	£3.79

MISCELLANEOUS

Car sticker 'Amateur Radio' (2 colours)	£0.81	£0.69
Car sticker 'I Love Amateur Radio'	£1.14	£0.97
Car sticker 'I'm on the air with amateur radio' (4 colours)	£0.93	£0.79
Car sticker 'I'm monitoring .5, are you?' (2 colours)	£0.81	£0.69
Radio Communication back issues	£1.47	£1.25
Radio Communication bound volumes	£22.69	£19.29
Radio Communication Easibinder	£5.82	£4.95
RSGB HF contest log sheets (100)	£3.87	£3.29
RSGB VHF contest log sheets (100)	£3.87	£3.29

OTHER PUBLICATIONS

All About Cubical Quad Antennas (RPI)	£7.00	£5.95
All About Vertical Antennas (RPI)	£7.65	£6.50
Amateur Radio Computer Networking Conference Papers (ARRL) Vols. 1-4	£18.10	£15.39
Vol. 5		Out of Stock
Vol. 6		Out of Stock
Vol. 7		Out of Stock
Amateur Radio Satellites - The First 25 years (AMSAT-UK)	£4.65	£3.95
Antenna Compendium Volume 1 (ARRL)	£10.76	£9.15
Antenna Notebook, W1FB (ARRL)	£7.82	£6.65
ARRL Antenna Book	£13.71	£11.65
ARRL Handbook 1989 (hardback)	£16.41	£13.95
ARRL Operating Manual	£13.65	£11.60

RSGB LENGTH-OF-MEMBERSHIP LAPEL BADGES

MINI BADGE

STANDARD BADGE

STANDARD CALLSIGN LAPEL BADGE

DE LUXE CALLSIGN BADGE



0 to 5 years



5+ to 10 years



10+ to 25 years



25+ to 40 years



40+ to 50 years



50+ years

Be proud of your years of membership. Order your special badge NOW. For 1 month only prices reduced by 25% if order is received by 31 August 1989

Mini	0-68p
Standard	£1-02
Standard callsign	£2-21
De luxe callsign	£2-51

RSGB — MAIL-ORDER PRICE LIST

NON-MEMBERS MEMBERS

AX25 Amateur packet radio link-layer protocol (ARRL)	£6.76	£5.75
Beam Antenna Handbook (RPI)	£8.53	£7.25
Better Short-wave Reception (RPI)	£5.87	£4.99
Callbook - International Listings 1989		Out of Stock
Callbook - N.American Listings 1989	£19.41	£16.50
Care & Feeding of Power Grid Tubes (Varian)		Out of Stock
Complete Dxr (Idiom)	£8.47	£7.20
Complete SW Listener's Handbook (Tab)		Out of Stock
DX Edge (HF propagation aid)	£21.07	£17.91
DX Power: Effective Techniques	£9.29	£7.90
FCC Rule Book, ARRL	£7.00	£5.95
First Steps in Radio (ARRL)	£4.41	£3.75
Fuji - FO12 Technical Handbook (AMSAT UK)	£5.65	£4.80
Guide to Oscar Operating (AMSAT UK)	£2.94	£2.50
Hints and Kinks for the Radio Amateur (ARRL)	£4.12	£3.50
History of QRP (Milliwatt Books)	£9.88	£8.40
Interference Handbook (RPI)	£8.35	£7.10
International VHF FM Guide (G3UHK/G8AUU)	£3.29	£2.80
Introduction to Weather Satellite Reception	£2.94	£2.50
Joy of QRP (Milliwatt Books)	£11.35	£9.65
Linear Op-Amp Handbook (Carr)	£18.62	£15.83
Low Band DXing (ARRL)	£9.35	£7.95
Morse Code the Essential Language (ARRL)	£4.06	£3.45
Novice Antenna Notebook (ARRL)		Out of Stock
Operating an Amateur Radio Station (ARRL)	£2.65	£2.25
OSCAR 13 Handbook (AMSAT-UK)	£6.06	£5.15
Packet Radio Handbook (Tab)		Out of Stock
Passport to World Band Radio 1989 (RDI)	£11.71	£9.95
QRP Notebook (ARRL)	£4.12	£3.50
Radio Amateur Antenna Handbook (RPI)	£8.00	£6.80
Radio Amateur DX Guide (ARCI)	£4.12	£3.50
Radio Amateur Map of North America (ARCI)	£3.59	£3.05
Radio Frequency Interference (ARRL)	£4.12	£3.50
RTTY Awards (BARTG)	£3.47	£2.95
RTTY The Easy Way (BARTG)	£3.47	£2.95
Satellite Anthology (ARRL)	£4.41	£3.75
Satellite Experimenters' Handbook (RPI)	£7.94	£6.75
Simple Low Cost Wire Antennas (RPI)	£8.53	£7.25
Slow Scan Companion (BATC)	£3.47	£2.95
Solid State Design for the Radio Amateur (ARRL)	£10.53	£8.95
Towards the Radio Amateurs Exam. (Stam)	£6.76	£5.75
Transmission Line Transformers (ARRL)	£8.18	£6.95
Tune in the World with Ham Radio (ARRL)	£4.12	£3.50
TV for Amateurs (BATC)	£2.02	£1.72
USA Licence Manual - Advanced Class, ARRL	£4.12	£3.50
USA Licence Manual - Extra Class, ARRL		Out of Stock
USA Licence Manual - Technician Class, ARRL	£4.12	£3.50
World Atlas (ARCI)	£4.67	£3.95
Yagi Antenna Design (ARRL)	£11.71	£9.95
Your Gateway to Packet Radio (ARRL)	£7.70	£6.55
2MT Whistle - The Birth of British Broadcasting	£16.24	£13.80
25 Fun to Build Projects for Learning Electronics Theory	£7.82	£6.65
99 Test Equipment Projects (Tab)	£12.88	£10.95

INTERFERENCE SUPPRESSION FILTERS

Braid Breaker Filter	£7.39	£6.28
Ferrite Toroid (pack of 2)	£3.14	£2.67
High Pass Filter for FM Broadcast Band 2	£7.70	£6.55
High Pass Filter for UHF TV		Out of Stock
Notch Filter Tuned to 14MHz	£7.70	£6.55
Notch Filter Tuned to 21MHz	£7.70	£6.55
Notch Filter Tuned to 28MHz	£7.70	£6.55
Notch Filter Tuned to 50MHz	£8.27	£7.03
Notch Filter Tuned to 70MHz	£8.27	£7.03
Notch Filter Tuned to 145MHz	£8.27	£7.03
Notch Filter Tuned to 435MHz	£6.78	£5.76
RSGB Filter Kit	£51.00	£43.35
Six Section Filter for UHF TV	£20.29	£17.25

NON-MEMBERS MEMBERS

LANGUAGE AND MORSE INSTRUCTION AIDS

CW into Foreign Languages (VE3EIM, VE3MGY)		Out of Stock
Radio Amateurs Conversation Guide (OH1BR)	£5.65	£4.80
Dutch Supplement to Conversation Guide	£1.41	£1.20
French Cassette Supplement to Conversation Guide	£5.77	£4.90
German Cassette Supplement to Conversation Guide	£5.77	£4.90
Russian Cassette Supplement to Conversation Guide	£5.77	£4.90
Spanish Cassette Supplement to Conversation Guide	£5.77	£4.90
RSGB morse instruction tape (to 5wpm)	£5.04	£4.28

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership):		
One year - surface mail	£27.94	£23.75
Two years - surface mail	£53.37	£45.36
Three years - surface mail	£79.52	£67.59
One year - air (KLM) W.Europe only	£88.24	£75.00
Ham Radio Magazine, one year, by air	£22.00	£22.00

NEWSLETTER SUBSCRIPTIONS

Connect International (monthly)	£9.35	£7.95
DX News Sheet (weekly)	£21.77	£18.50
Microwave Newsletter (10 issues per year)	£7.94	£6.75
Raynet News (6 issues per year)	£5.82	£4.95
VHF/UHF Newsletter (monthly)	£9.35	£7.95

Newsletter subscription rates are those for subscribers in the UK and countries in the EEC. For rates to other destinations please contact the Circulation Department at RSGB. From where free sample copies of newsletters can also be obtained.

RAYNET SUPPLIES

Raynet Badge - Embroidered	£1.04	£0.88
Raynet Badge - Lapel	£0.89	£0.76
Raynet Badge Clip	£0.50p	£0.43p
Raynet Car Sticker - Circular	£0.65	£0.55
Raynet Identification Sticker	£0.51	£0.43
Raynet Manual, 1986 Edition	£3.41	£2.90
Raynet Poster	£0.98	£0.83
Raynet Tie	£5.83	£4.96

MICROWAVE COMPONENTS

Capacitors		
1000pF Coffin Capacitor (pack of 10)	£1.08	£0.92
Trimmer for G4DDK 1152MHz boards	£0.99	£0.84
Exciters		
GDHM32 Doppler Module	£74.06	£62.95
Hardware, PCBs & Laminates		
1152MHz Amplifier Board	£4.11	£3.49
1152MHz Local Osc. Source PCB (RC 2-3/87)	£3.87	£3.29
CBT-40 Mounted Termination, 40W, 50ohm	£22.29	£18.95
Cu Clad 233 PCB 0.005", 2 x 1 inch block	£0.99	£0.84
Cu Clad 233 PCB 0.031", 2 x 1 inch block	£1.46	£1.24
Regulator PCB (RC 10/81)	£2.50	£2.13
UHF Source PCB (RC 10/81)	£7.06	£6.00
WG20 Copper Waveguide (per foot)	£7.14	£6.07
Semiconductors		
DC1501E Mixer	£14.39	£12.23
MD4901 SRD	£10.88	£9.25
MGF1302 GaAs FET	£8.18	£6.95
uPB581C 2.6GHz Divide by 2 Prescaler	£8.02	£6.82
uPB582C 2.6GHz Divide by 4 Prescaler	£8.02	£6.82

ORDERING INFORMATION

NON-MEMBERS. Use left hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right hand price columns. It is essential that you quote your callsign or RS number so that you can be recognised as a member.

PRICES. These include postage, packing, and VAT (where applicable) and are subject to change without notice.

AVAILABILITY. Goods are available less postage and packing from RSGB Headquarters between 9.15am and 5.15pm Monday to Friday. However you are advised to confirm availability of goods by telephone before visiting Headquarters. We attempt to keep ample stocks of all our sales items, however as this list has to be prepared several weeks in advance we cannot guarantee that any item on this price list is immediately available.

PAYMENT. Payment may be made by post enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. You may use your credit card for payment by post or by telephone. We accept Visa, Access (Mastercharge), American Express, and Diners Club cards. Our telephone number for orders is (0707) 59015 (24hrs). Please note that if ordering by credit card goods can ONLY be sent to the credit card holders address. This is a ruling of all credit card companies for security purposes. Our Giro account number is 533 5256.

DELIVERY. Goods will be despatched to UK destinations by 2nd class letter post or parcel post, or surface mail to overseas destinations. Please contact RSGB Headquarters for 1st class letter post or airmail rates. We normally despatch goods a few days after receipt of an order, but as delays can sometimes occur please allow 28 days before enquiring about non-delivery of goods.

ORDER FROM:
RSGB SALES (CWO)
Lambda House, Cranborne Road,
Potters Bar, Herts, EN6 3JE



Members visiting HQ are advised to telephone first to confirm availability of goods - 0707 59015.

FURTHER SELECTED Es EVENTS

Last month I looked at a selection of sporadic E events which took place during the 1987 season. This month we'll have a look at some aspects of what happened in 1988. In actual fact there are many events worthy of detailed examination, but space and time only allow a sample to be considered here. The main study concerns the first date - 10 July 1988 - but I'll make some comments later about other events going back to the previous year.

10 JULY 1988

This was the Sunday of the third weekend selected for the Es trials last year. Actually, there had been only limited activity on the other trial days selected, and the occurrence of a major opening on the 10th was most welcome in terms of the experiment. At this point I must say "thank you" to all who have sent logs for this event; I'd like to add that further logs for this day (Sunday 10/7/88) would enable a more useful study to be undertaken. However, much can be done with even a small selection of paths, but first I'll describe some of the background details to this event.

This part of July is supposed to be one of the favourable windows for Es owing to the number of meteor showers about that time; sources list the Orionids, Geminids and Capricornids to name but three! The local K index from Chambon-la-Forêt (48N 2E) for that day was relatively low and quite typical of Es days. The successive three-hourly K figures starting with 00-03UT were: 1,2,1,1 2,2,2,2 resulting in a daily A index of 8.

The opening had two phases. The first, during the morning, was brief and lasted for only about twenty minutes; the afternoon session produced widespread Es over a period of about two hours. The data for the morning session was rather limited and all the available paths in group 1 have been plotted - see Fig 28. This clearly shows a possible location for the Es as being over north-west Italy during the period 1021-1042UT. Incidentally, a 'blurred' region would be expected from a moving Es patch in view of the 20-minute span over which the QSOs took place. Additionally, if the Es consists of a series of wavelets (see Fig 11 of part 1, [23]) there may be a large multi-Es region even for a fixed time analysis. The afternoon session started just before 1400UT and lasted until 1600UT. There is a large amount of data for this period, and a selection of paths from the total set have been used to define the main area of activity. Furthermore, the afternoon period has been split into two parts; the first of these (path group 2) is shown in Fig 29. Again, we see a concentration of paths, this time over eastern France, and this also suggests a possible location for the Es patch during the period 1347-1500UT.

The second part of the afternoon produced a new set of paths between 1500-1601UT (labelled 'group 3') and these are plotted in Fig 30. This time the location of the crossing point for these paths was located over central Germany. The changes of the Es location during the whole opening are not easy to describe; first it seems to move north between group 1 and 2, then there is a sharp turn to the east for group 3. Care is required at this point since it would be easy to deduce that the Es has moved in this way, whereas the data merely shows that there were probably Es present in the three approximate regions.

In order to explore the weather link with Es I

AN INTRODUCTION TO SPORADIC E (part 4)

Jim Bacon, BSc, G3YLA.

obtained various meteorological charts, which were kindly supplied by the Met Office. From the visual point of view, the afternoon NOAA-9 satellite picture taken at 1448UT (Fig 31, which is

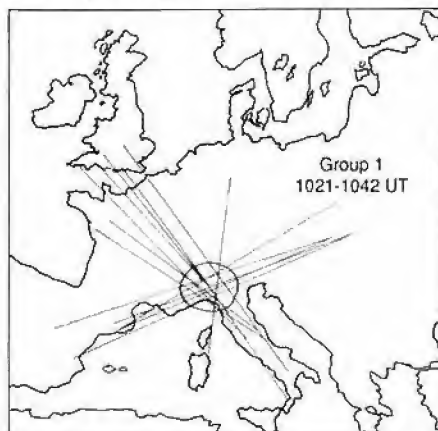


Fig 28. 10 July 1988 Es - Initial (20min) morning phase.

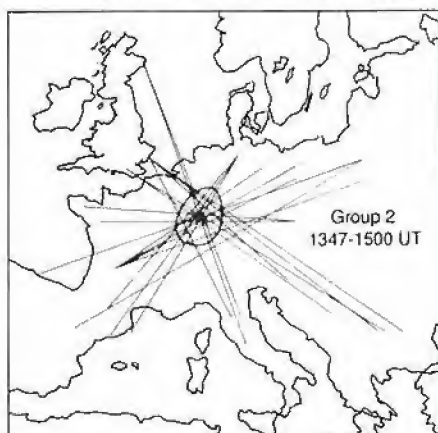


Fig 29. 10 July 1988 Es - First part of afternoon phase.

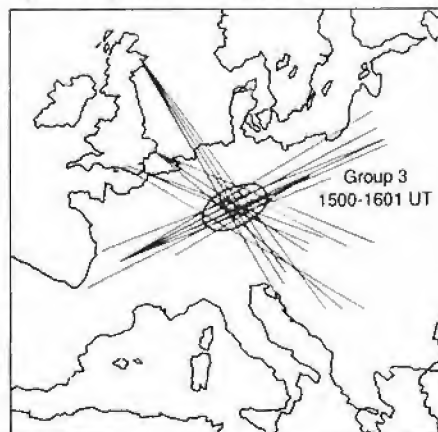


Fig 30. 10 July 1988 Es - Second part of afternoon phase.

by courtesy of the University of Dundee Satellite Station) provides some sobering evidence to the thunderstorm proponents! I think a schematic version is unnecessary since all the important features are very clear, printing permitting. Remembering the approximate locations of the Es, the corresponding part of the satellite picture is cloud-free; indeed, much of Europe was free of cloud on Sunday 10 July 1988. Typically, perhaps, the exception is Britain, where the band of frontal cloud was giving a rather damp afternoon with occasional rain. The small bright regions on the west coast of France and again near the coast of north-east Spain are 'sun-glint' and not cloud. This picture represented a turning-point for me in the Es project since it clearly showed that there must be some mechanism other than thunderstorms which could generate atmospheric gravity waves (AGW) and thence cause Es. Note that this does not rule out thunderstorms entirely, but it certainly does suggest another cause on this occasion.

The weather map for 1200UT on 10 July 1988 is shown in Fig 32. Much of Europe was covered by a large area of high pressure. Closer to home, Britain was under the influence of the frontal system belonging to an Atlantic low south of Iceland. The warm front near Denmark was a very weak feature and even the cold front was relatively inactive except over south-west England, where some heavier rain was reported. The approximate positions of the jet streams are also shown on the weather map. On the face of it, these appear to offer equally disappointing incentives to the proponents of jet streams as a cause of Es.

It is nonetheless worth a closer look at the upper-air weather patterns to see if there is perhaps some clue to be seen. A sequence of 12-hourly charts for 250mb, which is at a height of about 10km, were analysed to obtain the location of the jet streams on the 10th and these are shown in Figs 33, 34 & 35. Incidentally, it's worth mentioning that meteorologists measure the height of a given pressure surface, and the plotted heights become contours similar to a traditional map. The wind speed is proportional to the contour spacing, just as in a surface weather map). The wind speeds are plotted at 10m/s intervals starting with 30m/s. The main flow is that of a ridge over Europe, and the ridge axis is seen to move steadily eastwards during the day.

The location of the Es patches are shown on the chart for 12UT and seem to cluster about the ridge axis. It is well known in aviation meteorology that regions near a jet stream may contain clear air turbulence (CAT). Perhaps less well known is the tendency for CAT to occur along the axis of a developing upper (air) ridge. It is also easy to see how the jet may be associated with the cause of Es, whereas - in roughly the same position - the developing ridge axis may be the true culprit. A 'developing ridge' is simply one whose amplitude is increasing with time.

Finally, it is worth getting some numerical feel



Fig 31. (left) 10 July 1988 Es — NOAA-9 satellite photo, taken at 1448UT.

Fig 32. (below left) 10 July 1988 Es — Weather map for 1200UT.

Fig 33. (below right) 10 July 1988 Es — 0001UT.

some major assumptions, not least of which is that the motion between 2 & 3 is normal to the ridge axis and that the centres of the region do represent a single identifiable Es 'patch'.

In the reverse sense, the same figures can be used to explore whether a moving ridge is compatible with the movement of the Es by assuming a typical horizontal propagation speed of 80m/s for Es which would leave 10m/s for the ridge movement. This figure is close to the observed one, although it is probably subject to much error.

This event is still capable of revealing more about the nature of Es and I hope to complete a full computer analysis in the future — PLEASE let me have your logs for it! The magic date again is Sunday 10 July 1988.

6, 7 & 8 JUNE 1988

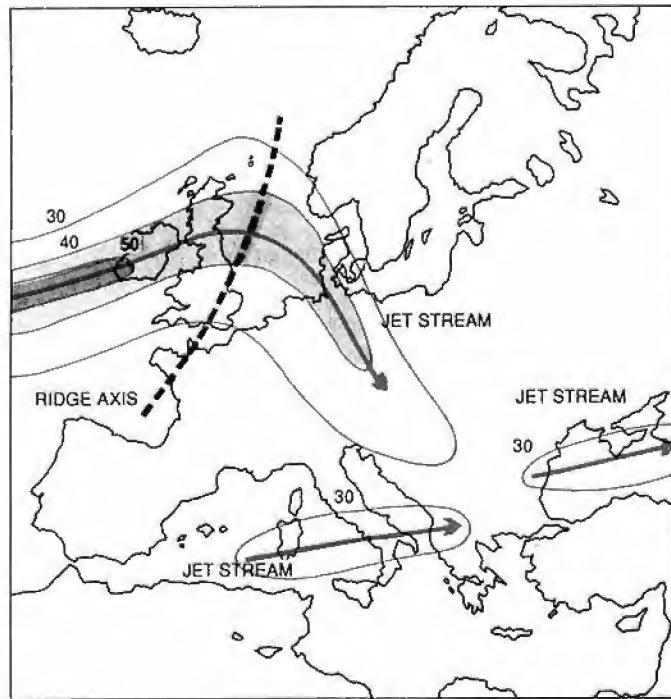
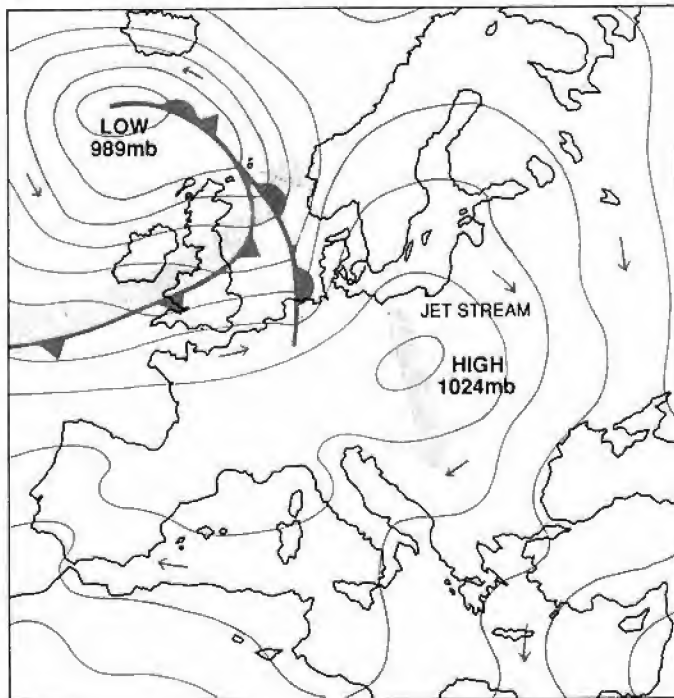
This period has been picked out because it represented a sudden change of activity. The action gradually built up through the 6th to give a very good day on 7 June 1988; then on the 8th there was virtually nothing. The geomagnetic indices reveal much about this sequence of events. Again considering the 3-hourly K indices from Chambon la Foret, shown in Table 5:

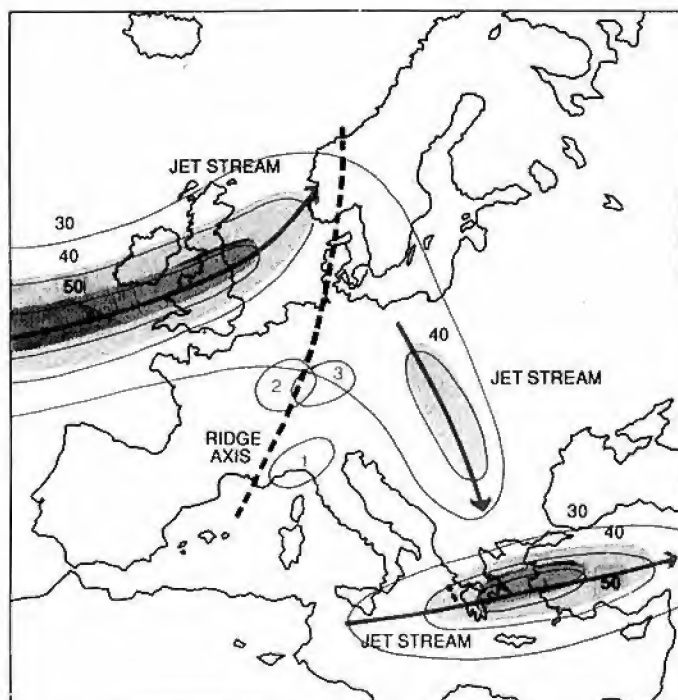
TABLE 5			
6th June 1988	K = 3,1,0,0	0,1,1,1	A = 2
7th June 1988	K = 0,0,1,1	1,1,1,3	A = 16
8th June 1988	K = 1,2,1,2	4,4,4,2	A = 13

for the movements of the various features. The morning Es was — I think — a completely separate event in the sense that it took place some 4 hours before the events of groups 2 & 3. However, groups 2 & 3 are definitely the same area of Es and their apparent movement is measurable. Taking the centre of each region as the datum point, the patch moved at about 80m/s. The ridge axis

moved at 10m/s during the 12 hours before midday and about 6m/s during the following 12 hours, so it is reasonable to assume a ridge axis movement of 8m/s. If this is subtracted from the measured Es motion, we find that the patch seemed to move at about 82m/s — a typical figure for Es and AGW as discussed in earlier parts of this series. This is, of course, a crude exercise with

As you can see, the index during the afternoon session on the 8th was much higher than that during the rest of the period. Equally, there was a general lack of suitable weather triggers on the 8th — at least from the UK. An interesting observation relating to the influence of the K index is that during the morning there was a brief opening to YO and I.





9 JANUARY 1988

This event goes to show that Es can occur at other times of the year. It represents a single QSO between G and YU between 1205 and 1209UT. The weather map valid for 1200UT on 9 Jan 1988 (Fig 36) shows a familiar pattern; indeed, there are quite marked similarities between this and the chart for 10 July in Fig 32. In this case there is a jet stream in roughly the correct location, and probably a developing ridge in the upper atmosphere – as in the July example. Both these features may have generated the AGW which later produced the Es.

20 JULY 1987

I have included this date to present the companion weather chart to go with the satellite picture shown as Fig 26 in last month's article [24]. You'll recall that this was a widespread opening during a period when the weather was anything but the hot and sunny stuff we usually associate with typical Es days. The large area of Europe which was in the circulation of the low pressure area over the Low Countries (see the chart for 1200UT in Fig 37) was decidedly cool and unsettled with heavy thundery showers. Furthermore, a jet stream was located around the periphery of the low. The contrast between the cool conditions and the hot, sunny weather to the south-east of the jet stream was marked by a weak cold front feature. Ahead of this, in the hot and sunny region over I, YU & HG, there was again a possible upper ridge. This leaves the jury well and truly out since thunderstorms, a jet stream and an upper ridge are all present! Oh well.

13 JULY 1987

This is another example chosen to include a weather chart for a previously shown satellite picture (see Fig 24 [24]). It gives a further chart type to watch out for during future seasons. The warm front over central France at 1200UT shown in Fig 38 moved slowly north during the day and gave very wet weather to southern Britain on the following day. Ahead of this there was a possible

jet stream and perhaps a developing upper ridge – all of this in addition to the obvious thundery activity visible over Spain and Biscay in the satellite picture. The Es path, as detailed in Table 3 last month [24], was to Spain and Morocco.

1987 TRANSATLANTIC PATHS ON 50MHz

This topic represents quite a challenge to theories about the various Es weather triggers. The days in question were shown in Fig 19 last month [24]. I don't intend to list them all here but it is instructive to see what the typical weather charts for these days looked like.

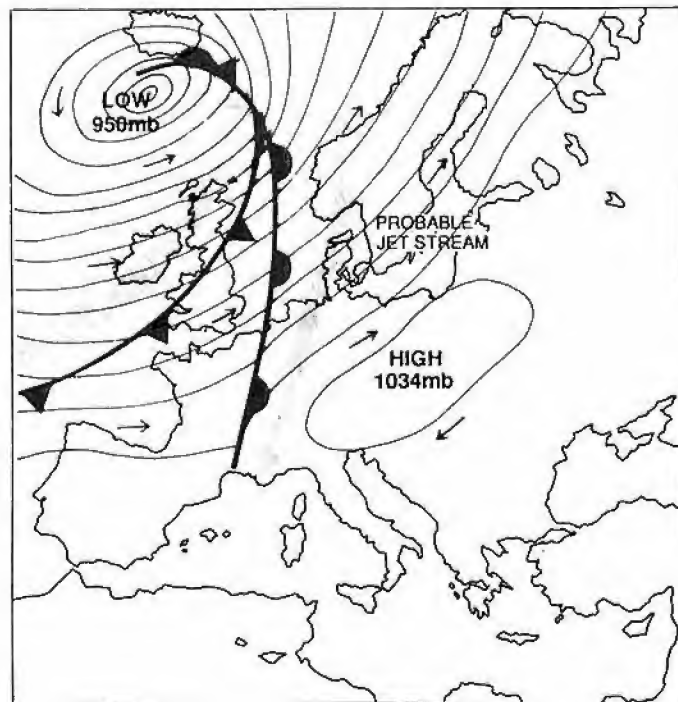
There seem to be two basic types of synoptic

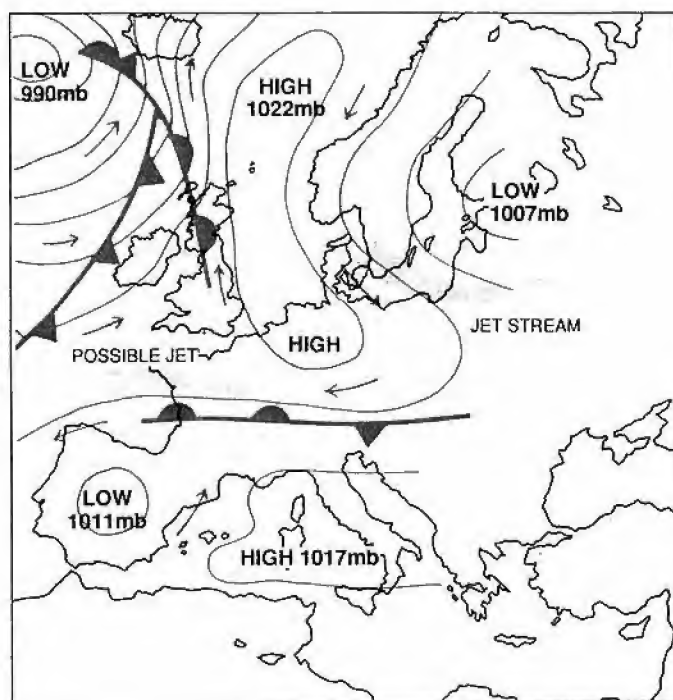
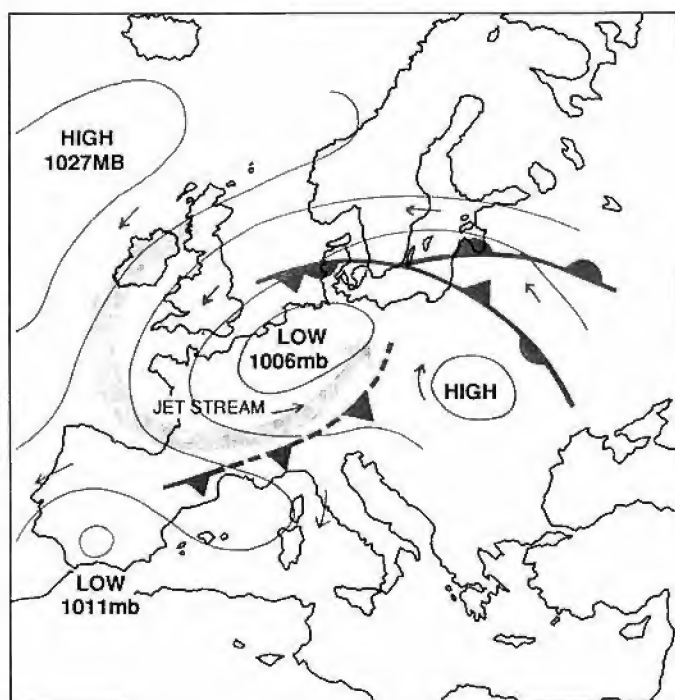
situation which are favourable for trans-Atlantic Es, given the presence of the other factors mentioned in part 2, [25]. The important features of the more typical case are shown on a schematic chart, see Fig 39. Again, the main potential AGW generating features are a jet stream and a possible upper ridge just to the west of it. Although they are relatively rare, thunderstorms do occur over the Atlantic – especially along the cold front near 40W in Fig 39. Note that this schematic applies to the USA paths; a slightly different chart showing a large low in mid-Atlantic south of Iceland would be more typical of the Greenland and Caribbean routes.

Fig 34. (top left) 10 July 1988 Es – 1200UT.

Fig 35. (top right) 10 July 1988 Es – 0001UT, 11 July.

Fig 36. (right) 9 January 1988 Es – 1200UT.





CONCLUSIONS

The occurrence of Es is still a very mysterious phenomenon which is a long way from being fully understood. However, the observations and data presented in this series have shown some useful factors to be considered when trying to predict where and when the next opening will be.

Here's a check list; if you get a YES answer for any one or more, the chances of working the DX are improved.

- 1) Is the K index low (usually 3 or less)?
- 2) If the K index is high, check for auroral Es; use the direct path, not via aurora.
- 3) Is there any sign of meteor activity? (not necessary for auroral Es)
- 4) Has Es already taken place in the morning, and has there been no significant change in the K index?
- 5) Look for weather triggers — are there jet streams & thunderstorms?
- 6) Is there any short skip on 28MHz? Check the beacons.

7) Is there any Es on the next band LF? Es reaches higher frequencies as the opening develops.

8) Es do move — follow any apparent trend.

On the question of moving Es (as in the mega-opening of Saturday 17 June 1989; see *Spectrum Analysis this month* — Ed) there is one possible explanation for the apparent rapid change of direction of an event — especially towards the end of its life. The sketch map in Fig 40 shows a typical 1800km QSO with an Es patch at the mid-point of the path. Now assume that there are suitable triggers at mid-path around the compass from the first contact with HG to the last with EA7. If the period of Es generation is linked to the solar semi-diurnal tide, as mentioned in part 2 [25], the migration of the tide across Europe (at a rate of about 1° longitude every 4 mins) is going to control which paths are open at any given time. In the case sketched in Fig 40, the opening to HG starts to close at 1600UT with an Es at approx 12° E and finally finishes some 64 minutes later when the path to EA7 closes for an Es at 4° W. These times are for example only and the sudden cut-off

of a path is somewhat unreal, but they do serve to show how the movement of the solar semi-diurnal tide can lead to quite rapid apparent change in direction of an opening.

It is likely that the solar tides will contribute very strongly to the seasonal variation of Es and probably account for the relative absence of Es in the equinox.

One further point on the change of direction of an opening is that the difference between the morning and afternoon phase is more likely to follow the movement of the weather trigger in a real geographical sense rather than any apparent motion as mentioned above. Indeed, the difference may be that the Es has moved out of range from a given location altogether. As a rule of thumb, assume a slow eastward movement of the trigger unless there is evidence to the contrary.

A further concluding comment is required for the state of the weather trigger debate. At the moment, I strongly suspect jet streams or their associated nearby upper ridge pattern as being the prime sources for AGW which may subsequently trigger Es by the wind-shear mechanism. Thunderstorms are not totally out of court, but they are often present in the appropriate area anyway and may be guilty by association only. The typical juxtaposition of these features is shown in Fig 41, which shows how a correlation may appear to favour the wrong physical cause of AGW/Es since all three weather triggers are close together. Thunder activity is often found just ahead of an upper trough.

I hope this series of articles will have provoked some discussion on the possible causes of Es. I hope also that it will show the value of good-quality amateur radio observations in propagation studies of this sort. I would like to repeat my request for more data for 10 July 1988 and to add a request for information on what you worked

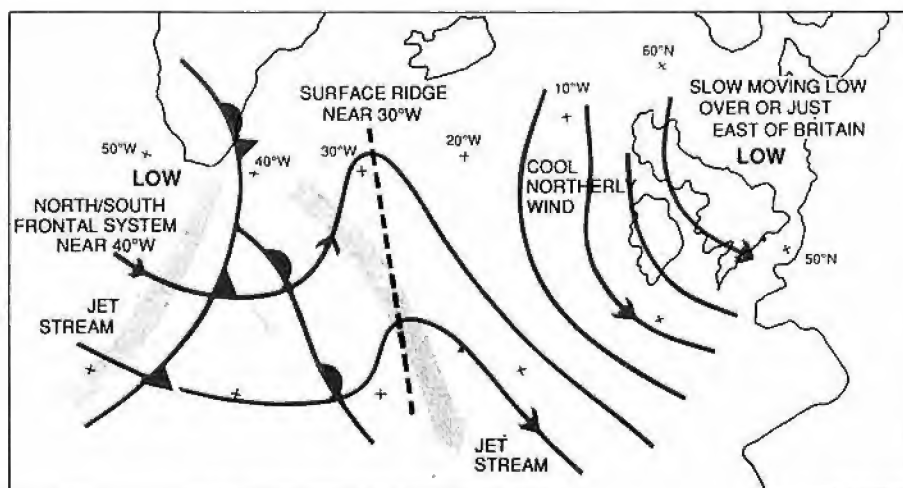


Fig 37. (top left) 20 July 1987 Es — 1200UT.

Fig 38. (top right) 13 July 1987 Es — 1200UT.

Fig 39. (left) Typical weather map for trans-Atlantic Es.

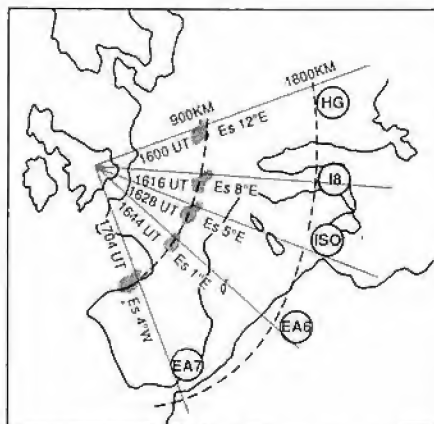


Fig 40. Apparent movement of Es due to solar tide.

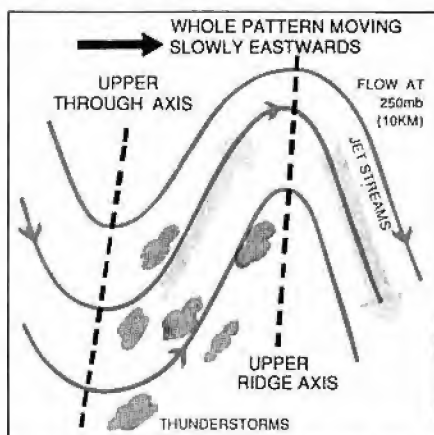


Fig 41. Juxtaposition of the three suspected weather triggers of Es.

during the very impressive opening this year on 17 June. Please let me have your logs – the address is:

Jim Bacon,
Highways, East Tuddenham,
DEREHAM,
Norfolk NR20 3AH

Please keep my postman busy!



ACKNOWLEDGMENTS

Firstly I must record my gratitude to the RSGB for their help and encouragement with this project. It is impossible to name all those radio amateurs who have helped in this project, but they form the core of this study, and to them must go my greatest thanks. It is obvious that the work of many research institutions (particularly the Physics Departments of the Universities of Southampton, Aberystwyth and Oulu, Finland) has been invaluable in helping a layman understand the complexities of the ionosphere; I hope I have not distorted their advice too badly in the translation into this series of articles. I should also record the helpful supply of advice and meteorological data by the Met Office and Dundee University and the support of Anglia Television, who have tolerated a forecaster with his mind on a higher atmosphere than usual – I must devise a TV symbol for Es!

REFERENCES

- [23] An introduction to Sporadic E Part 1, *RadCom* May 1989, pp 37-41
- [24] An introduction to Sporadic E Part 3, *RadCom* July 1989, pp 51-54
- [25] An introduction to Sporadic E Part 2, *RadCom* June 1989, pp 37-39

CROSSING THE POND ON TEN

As the current sunspot cycle nears its peak, Peter Simpson, G3GGK, reminds us of the pioneering days of 1928 when the first UK to US 10m contact was established.

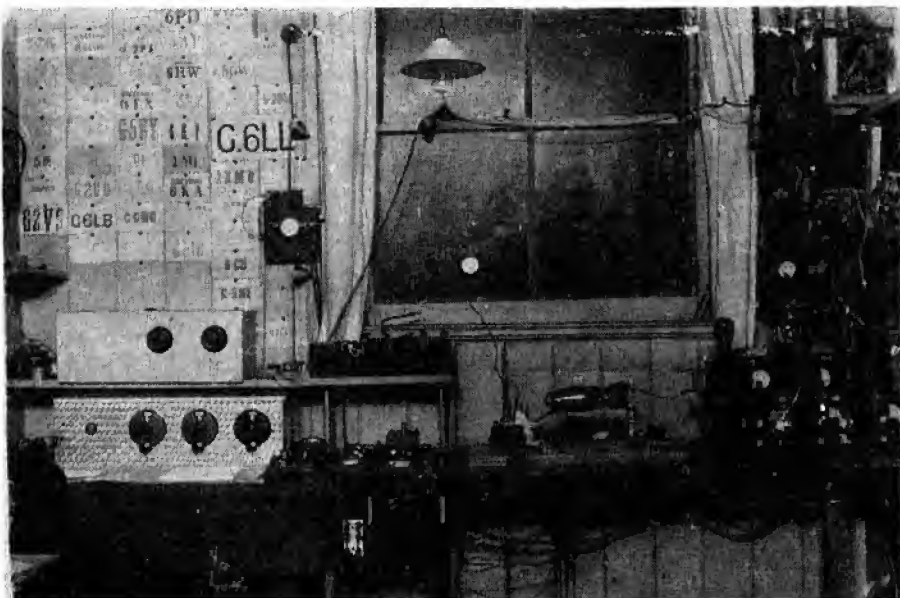
October 1988 marked the sixtieth anniversary of the first two way QSO on 10 metres between the UK and the USA.

The recent upturn in radio propagation conditions has introduced many amateurs, licensed over the past few years, to their first experience of 10 metre working. The ease with which long distance S9 contacts can be made using modest power levels and simple antennas impresses even those who take things such as telephone and television by satellite for granted.

Using equipment no larger than a car radio and cheap vertical antennas, crossing the 'Pond' as it was often called, has become a regular and easy pastime for many amateurs. How did this start, who were the pioneers, and what equipment did they use?

It was in the late 1920s that amateurs began to realise the potential for intercontinental working on ten metres. When one remembers that the conditions which permit long distant contacts on this band are cyclic and tend to peak over an eleven year period, it is interesting to speculate how and when the band would have been developed had conditions in 1928 been at an absolute low.

Fig 1. G6LL in 1928.



Certainly when one examines the equipment used in that period, good propagation conditions were a pre-requisite.

One of the foremost British pioneers on ten metres was James W Mathews G6LL. 'Jimmy' lived at that time in East London and was undoubtedly one of the country's most enthusiastic amateurs. His technical skills were extremely well developed and although not an engineer by profession he produced much advanced equipment and became acknowledged as an authority on radio techniques. In addition to this, he worked tirelessly for the RSGB in an editorial capacity, serving on Council and many committees, finally being made Vice President of the Society in 1951.

Among the many amateurs in the USA, who were experimenting with the ten metre band was W2JN in New York. American amateurs were making long distance contacts right across North America, so clearly it should have been possible to work across the Atlantic Ocean.

SPECIAL LICENCE

During the 1920s it required a special Post Office licence which permitted amateurs in the UK to conduct 'Trans Oceanic Wireless Experiments'. The licence issued to G6LL was dated 19th October 1928, and it was valid for six months only. This permit had then to be renewed each year. The permit allowed operation on the 7, 14, 28 and 56MHz Bands, and power was limited to 50Watts DC input to the stage energising the antenna. Operation was limited to two hours in any consecutive twenty four hour period or ten minutes in any one hour between 11pm and 8am. The relative freedom enjoyed by present day operators contrasts sharply with this and is in no small way due to the continual efforts of the Society over the last seventy five years.

In the Autumn of 1928, Mathews had completed a crystal controlled transmitter for 80, 40, and 20

metres, this is visible on the right hand side of the bench in **Fig 1**. To this he added a power doubler with the valve mounted horizontally, this is in the centre of the bench. Note the lead from the antenna ammeter clipped directly onto the PA coil! With this arrangement the doubler would possibly be running at 50Watts input but the RF power out on ten would probably not exceed 10Watts. The antenna was a vertical Zepp 16 feet long at a height of forty feet.

To the left of the bench is the receiver. This was known as a 1V2 and consisted of a screened grid RF stage mounted through a screen, a triode detector and two low frequency amplifiers. The neat layout and the 'engine turned' aluminium work testify to 6LL's care and attention see Fig 2.

STATESIDE

Over in the USA W2JN used a similar receiver to that of 6LL but with only one low frequency stage. The transmitter was however of totally different design. It was a single valve TPTG (Tuned Plate Tune Grid) power oscillator using 3000Volts of 60Hz as plate supply. Power input was probably about 200Watts. This was a common arrangement at that time since it avoided the need for rectifiers or DC machines, and the valve would conduct only on positive half cycles of the applied voltage. It gave the transmission a characteristic hum on the note. W2JN also used a half wave Zepp antenna with quarter wave feeders and hence current or series feed. Such an arrangement must have posed problems of chirp or drift but since receiver bandwidths were high, it was manageable. **Figs 3 and 4** show the detail of W2JN's station.

So now the stage was set, two amateurs each on either side of the Atlantic experimenting on ten metres. Remember that 6LL's permit was dated 19th October 1928.

Mathews log entries record:-

Sunday 30th September 1928

1300 Hrs 10.21 (Metres)

Worked G2FN on CW (First QSO)

Sunday 7th October 1928 1255 Hrs

Phone test modulating the twenty metre doubler.
Very low modulation worked G5QF
(Several more G contacts but no DX)

Sunday 14th October 1928 1540 Hrs

Cld. W2BDA reading him at R2 AC (Alternating Current Hum) No QSO

1620 Hrs Cld. W4CL reading him R2 (AC) No QSO
Sunday 21st October 1928 1430 Hrs

Cld. W2JN on CW 10.21 (Metres)

recd. him R5 (AC) QSS R2

Reported my sigs QSA R6 DC vy. steady

Thus occurred the very first G to W QSO on ten metres. The following week-end the QSO was repeated.

Mathews was not the first to cross the 'Pond' on ten; that honour fell to EF8CT in France who worked W2JN earlier in October. Propagation conditions were clearly very variable at that time and in the end it was chance and opportunity which governed who would be first across. Following 6LL's QSO many other amateurs in Europe succeeded as conditions varied the propagation paths. Now, as we operate our black (or grey) boxes on the HF bands we should spare a moment of thought to all those pioneers in amateur radio who had no choice but to make their own gear, and marvel at what they achieved, in particular those who sixty years ago opened up ten metres 'Across the Pond'.

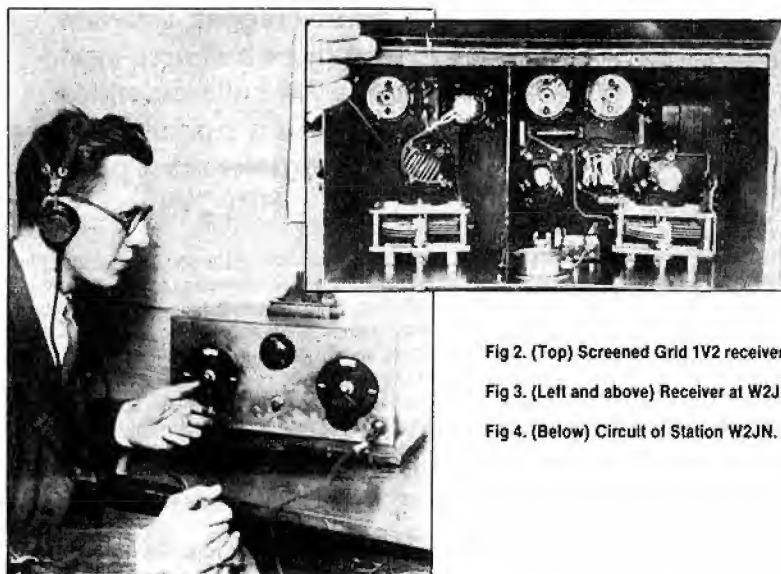
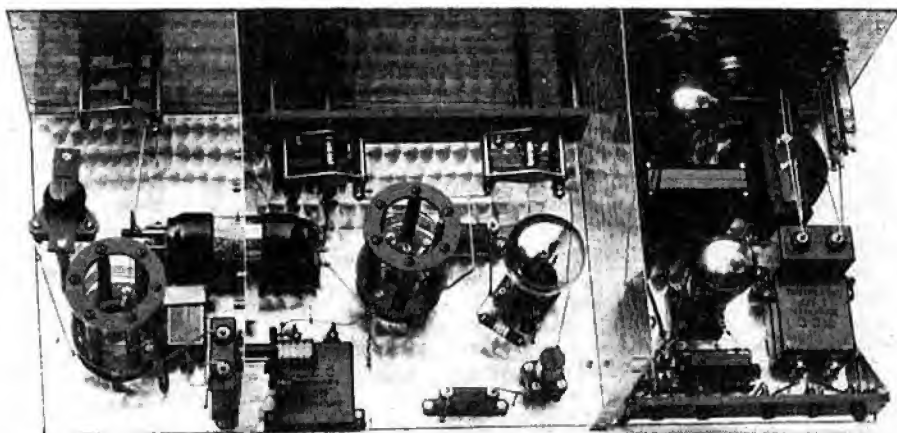
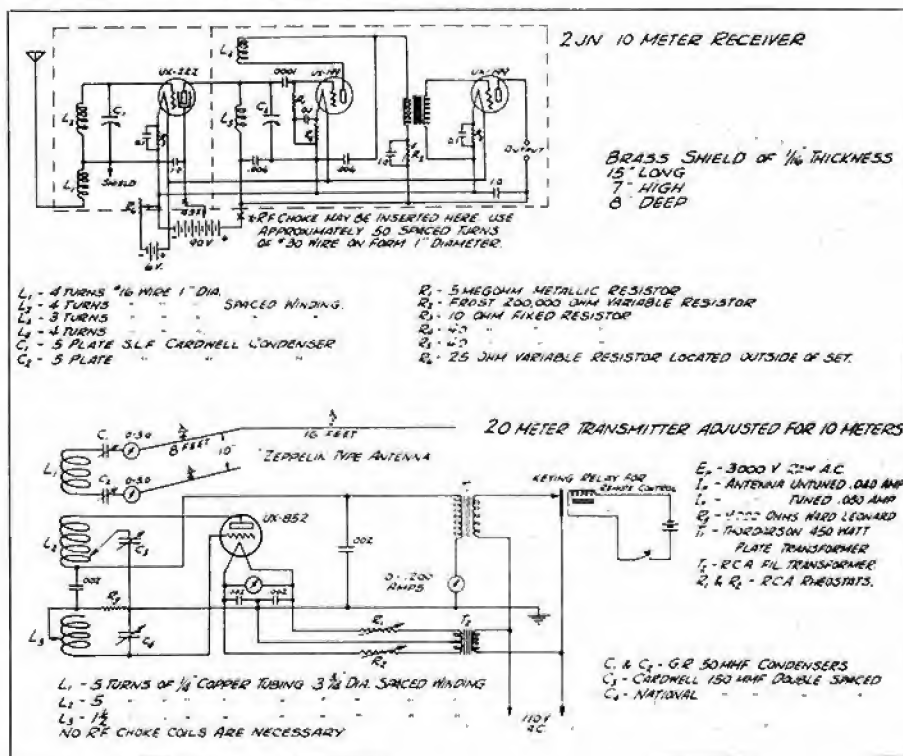


Fig 2. (Top) Screened Grid 1V2 receiver 1928.

Fig 3. (Left and above) Receiver at W2JN.

Fig 4. (Below) Circuit of Station W2JN.



I make no claim for originality, but this antenna has served me well during the past few months and I really believe that the concept deserves an airing.

The project started life when I was contemplating stacking two HB9CVs for extra gain and wide coverage. Being not too inexperienced at design and construction of electro-mechanical devices I really believed that I would have been taking the easy (but more expensive) way out, and was certain that an equivalent home-brewed assembly would perform as well, and probably without the 'fiddly detail' contained within the HB9. My suspicions were well founded; I tackled the project, and it worked admirably.

Performance was wholly satisfactory, achieving a maximum gain of 6-7dB, with a horizontal beamwidth of about 150°. SWR is at a minimum of 1.05 at 145MHz, increasing slightly to 1.25 at the band edges.

I pieced together two 5/8 wavelength elements, with added reflectors, all compactly mounted in a wooden frame. Overall dimensions don't exceed 270 x 40cm. Fig 1 illustrates the arrangement. I found it quite simple to construct, and it didn't involve any 'difficult' components. The wooden frame is fabricated from 21mm square timber, selected for straightness and no difficult grain which could later result in warping. The best material is ramin, but in this size it's not too cheap. The joints between the 'booms' are most easily fabricated from wooden angle brackets - if you are competent at proper timber joints then so much the better, for that approach yields a tidier antenna, albeit with the same performance!

Antenna elements are 3/16" solid aluminium rods. Metal merchants stock this in 4m lengths, and so buy two and cut them both into 2.2 and 1.8m lengths. From the 1.8m lengths you will form the two driven elements, and one of the 2.2m

THE 'EXTRA- ZIP'

**Paul Tregear, G8PQM,
describes a simple stand-
alone 2M colinear which is
ideal for any homebrewer as
an alternative to a pair of
HB9CVs.**

lengths will go towards the pair of reflectors. Final dimensions of the elements are shown in Fig 1. Retaining the elements in the wooden frame is no more complicated than drilling six tightly-fitting holes, and pushing the rods home.

The shorting link near the central frame anchor is used for tuning the antenna, and the balun connections (marked X-X) are adjusted until the correct impedance match of 200ohms is attained. Initially, the clips and link are made from small fuse clips, which can be moved along the rods

easily. Once the correct positions have been located the fuse clips can be replaced with screwed clips.

To avoid exposing the balun to the weather, it is quite permissible to keep it close to the rig and link it to the antenna with any convenient length of 300ohm ribbon feeder. The 4:1 coaxial balun, made from a half-wavelength of 50 or 75ohm coax, yields a 75ohm to 300ohm conversion; to match the more likely requirement of 50ohms a series section match (ref. *Amateur Radio Techniques*) will need to be included, as shown in Fig 2. To set this up, first solder the lengths of 50 and 75ohm cable at point B, and then cut the lengths AB and BC according to the formula:

$$l = \frac{\lambda}{12} \times \text{Vel. factor}$$

A similar approach should be possible on 4, 6 or 10m, but of course the dimensions preclude the use of metal rod and vertical polarisation. By running horizontal polarisation and using wire with spreaders, it should be a practical proposition to scale down the design, although I confess to not having tried it out yet. See Fig 3.

Horizontal beam width will not be so great with horizontal polarisation, unless it's influenced by ground effect. Dimensions are left for you to calculate, from the proportions shown in the figure; I will just add that the overall length of a 10m antenna will extend to about 45ft! Again, 300ohm feeder is the most suitable.

In any form, I believe the arrangement is compact, neat and relatively portable. It's ideal for a tiny garden - like mine. With its back to a wall, it works fine, albeit with slight retuning required. It has been a boon to me, and I would hope that the same can hold true for any other brave experimenters. □

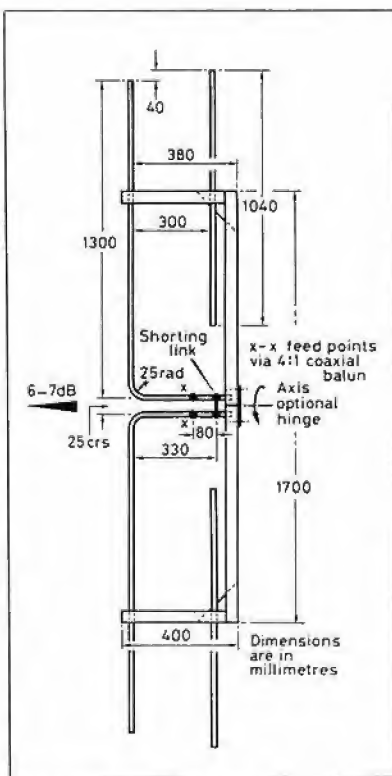


Fig 1. Construction of the antenna

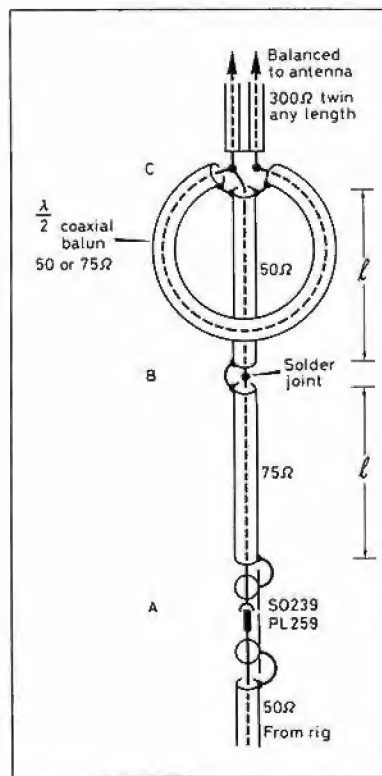


Fig 2. Balun and serial section feed

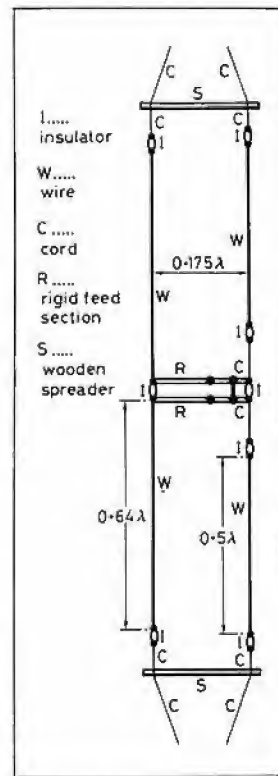


Fig 3. Scaled version for 4, 6 and 10m

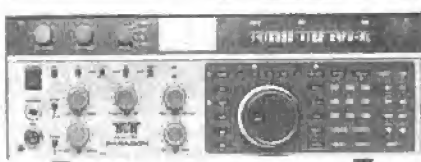
LONDON'S MULTI-BRAND PRODUCT DISTRIBUTOR

AMCOMM

ONE
STOP
BUYING!

FOR PRODUCT CHOICE, MAIL ORDER AND SERVICE

NOW STOCKING TEN-TEC



Paragon 100W HF Multimode P.O.A.
Corsair II 100W HF TCVR with PTO P.O.A.
Argosy Portable HF 50W TCVR P.O.A.
Century 50W CW HF TCVR P.O.A.
Titan 1500W HF Linear P.O.A.
Hercules 1KW Super Linear P.O.A.

All Accessories Available - Call for Prices!

MICROPHONES

Adonis AM303G £49.55
Adonis AM503G £65.95
Hell HMS Table Mic £49.95
Hell BM10 Boom/Headset Mic £49.95
Icom SM8 All Icom £79.00
Icom SM10 Table Mic with Equaliser £113.00
Yaesu MD1B8 Table Mic £75.00
Yaesu MH1B8 Hand Mic £21.00

Add £2.00 P&P

BNOS AMPS & LINEARS

LSO 6mtrs 3 in 25 out £74.75
LP50 6mtrs 3 in 50 out £138.00
LP50 6mtrs 10 in 50 out £138.00
LPM 6mtrs 10 in 100 out £235.00
L144 2mtrs 3 in 25 out £74.75
LP144 2mtrs 3 in 50 out £138.00
LP144 2mtrs 10 in 50 out £138.00
LPM144 2mtrs 3 in 100 out £235.00
LPM144 2mtrs 10 in 100 out £205.00
LPM144 2mtrs 10 in 180 out £355.00
LPM144 2mtrs 25 in 180 out £305.00

UHF also available

TL50/28/25 watt £316.25
TL50/144/25 watt £299.00
TL70/28/25 £316.25
12/25 amp PSU £249.00
12/12 amp PSU £145.00
12/6 amp PSU £89.00
12/40 amp PSU £499.00
12/5E amp PSU £74.75
12/10E amp PSU £129.00
12/20E amp PSU £175.00
12/30E amp PSU £219.00

All Units Carriage £3.00

DATONG PRODUCTS

AD 270 Indoor Antenna 200KHz-30+Mhz £49.00
AD 370 Outdoor Antenna 200KHz-30+Mhz £69.00
D 70 Auto Morse Tutor £55.00
ANF Auto Notch Filter £65.00
FL3 Multi Mode Audio Filter with Auto Notch £125.00

Add £2.00 P&P

ICOM

IC 781 ICOM
IC 761 ICOM
IC 735 ICOM
IC 751A CALL AMCOMM NOW
IC 2KL ON 01-992 5765
IC 2KLP FOR LATEST AND
IC AT500 BEST PRICES!
IC AT150 ICOM
IC AT100 ICOM
IC R7000 ICOM
IC R71E CALL AMCOMM NOW
IC MICRO 2 ON 01-992 5765
IC 2E FOR LATEST AND
IC 2GE BEST PRICES!
IC 290D ICOM
IC 28E ICOM
IC 28H ICOM
IC 275E CALL AMCOMM NOW
IC 275H ON 01-992 5765
IC MICRO 4 FOR LATEST AND
IC 04E BEST PRICES!
IC 490E ICOM
IC 475E ICOM
IC 475H ICOM
IC 3210E ICOM

All accessories available
All units add £7.50 carriage

MFJ

989B 3Kw Fully Metered ATU all inputs £359.00
962B 1.5Kw Fully Metered ATU all inputs £239.00
949C 300w Fully Metered ATU all inputs £149.00
941D 300w Fully Metered ATU all inputs £99.00
945E 300w ATU coaxial + Wire Inputs £69.00
901B 200 Random Wire Tuner £59.00
1Kw Dummy Load Dry £28.35
1Kw Versaload £50.66
204B Noise Bridge £84.12
202B Noise Bridge £63.10
752C SSB Tunable Audio Filter £95.60

All Units Carriage £3.00

AMP PRODUCTS

NEW FROM USA: The Pile up Penetrator LK 500ZC linear amplifier. Some of the features: Full QSK, HF tank coil and Centralab bandswitch are silver plated, Hypersil plate transformer and separate filament transformer. Computer grade capacitors. Amateur continuous duty in all modes. ALO: Auto Lock Out ceases amp operation if mistuned or over current appears on the pair of two 3-500z valves. Full coverage WARC Bands. 2 speed fan, RF output: SSB 1.5KW PEP continuous. CW/1.2KW average continuous. SSTV & RTTY 1KW average, 1.5KW PEP. Call now or write for full spec literature.

PMR & MARINE EQUIPMENT

RENT OR BUY FROM OUR
LARGE STOCK OF THE
ICOM RANGE - CALL
01-992 5765 FOR
PRICE OR LITERATURE



DELIVERY NORMALLY FROM STOCK BY RETURN

WHERE A GOOD DEAL MORE COSTS A GOOD DEAL LESS!



VHF/UHF SCANNING RECEIVERS

Uniden H/Held 50XL 66-88, 136-174, 406-512 Mhz £99.00
Uniden H/Held 70XL 66-88, 118-174, 406-512 Mhz £179.00
Uniden H/Held 100XL 66-88, 118-174, 400-512 Mhz £189.00
Uniden Base Rcvr 175XL 66-88, 118-174, 400-512 Mhz £179.00
BJ200 H/Held 26-30, 60-88, 115-178, 210-260, 410-520 Mhz £229.00
AR2002 Base 25-500 Mhz and 800-1300 Mhz £475.00

All £2.50 P&P + Insurance

ROTORS

AR 200XL VHF L/Weight £49.95
Yaesu G400 Medium to Heavy £139.00
Yaesu G400RC Med/Heavy circular compass £169.00
Yaesu G800SDX Med/HD 450° turn, variable speed £325.00
Yaesu G1000 SDX HD 450° turn, variable speed £368.00
Yaesu KR5400 Elev/Rot HD Dual Control £279.00
Yaesu G600RC Heavy Duty £219.00

Carriage Included

YAESU MUSEN

FT 767GX YAESU
FT 757GX MKII CALL AMCOMM NOW
FT 747 ON 01-992 5765
FC 757 ATU FOR LATEST AND
FP 757HD BEST PRICES! YAESU
FT 767 2M module YAESU
FT 767 6M module YAESU
FT 767 70cm YAESU
FL 7000 Lin Amp CALL AMCOMM NOW
FT 23R ON 01-992 5765
FT 73R FOR LATEST AND
FT 790R BEST PRICES! YAESU
FT 690R YAESU
FT 290R YAESU
FT 212RH CALL AMCOMM NOW
FT 712RH ON 01-992 5765
FRG 8800 FOR LATEST AND
FRG 9600 BEST PRICES! YAESU
FT 736 2M 70cm 1.2Ghz YAESU

All Accessories Available
All Units Add Carriage £6.50

BUTTERNUT CUSHCRAFT
TONNA JAYBEAM
G WHIP HYGAIN MET

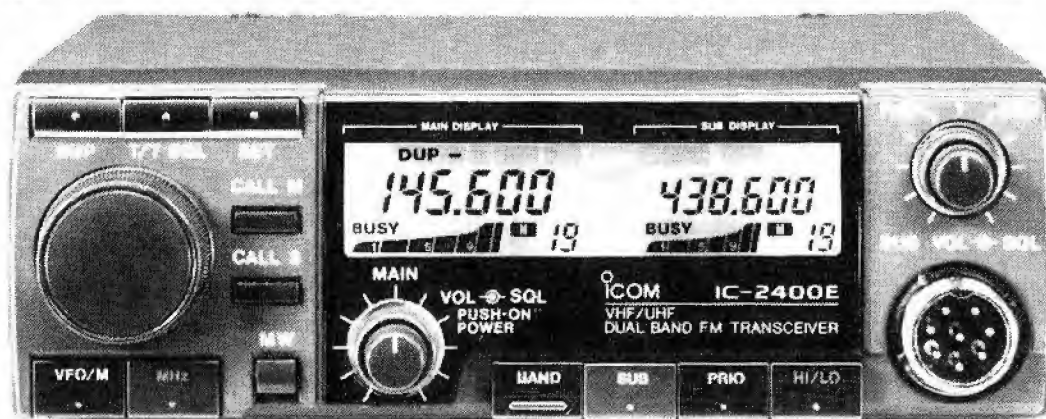
AMCOMM

373 Uxbridge Road, London W3 9RH, Tel: 01-992 5765 Telex: 24263 FAX: 01-992 5767 CLOSED MONDAYS

* Huge Range of Secondhand Equipment in Stock * All Previous Advertisements Void E&OE

ICOM

DUAL-BAND FM TRANSCEIVERS



IC-2400
144/430MHz
 2mts 45W
 70cms 35W

These new models from ICOM add a new dimension to the mobile scene. Enjoy the freedom of the open road and experience the advantages of simultaneous dual-band operation.

They are capable of receiving on both MAIN and SUB bands at the same time. While operating on one band, you can monitor a second band for activity. It is very easy to switch between the MAIN and SUB bands allowing you to reply immediately to calls received on either bands.

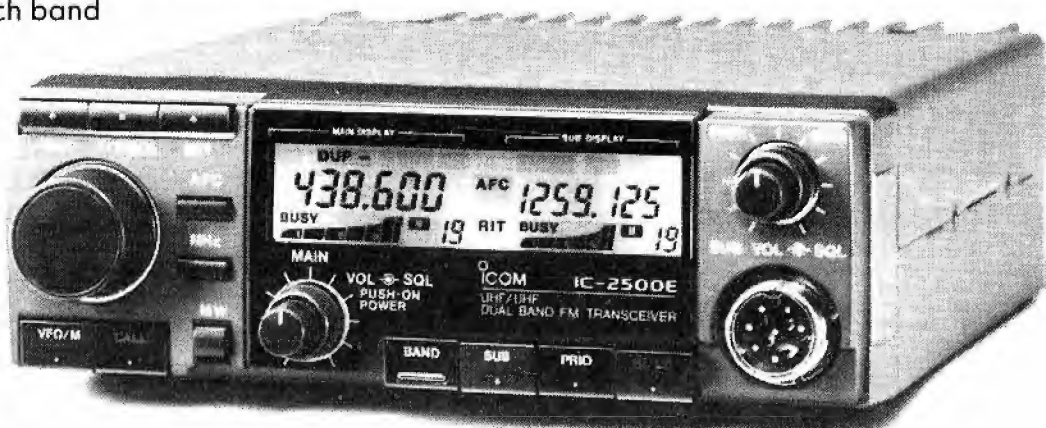
Full duplex operation lets you transmit on one band while receiving on the other for telephone style contacts. Each band can be independently

regulated using separate volume and squelch controls.

Both models incorporate 20 memory channels and a call channel for each band, these memory channels store all the information needed for repeater operation.

For 23cms operation the IC-2500 features a AFC function which automatically tunes the receive frequency to the transmit station frequency. The AFC function eliminates the need to retune if a stations transmit frequency is off centre.

IC-2500
430/1200MHz
 70cms 35W
 23cms 10W



Icom (UK) Ltd.

Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Count on us!

IC-751A HF ALL-BAND TRANSCEIVER



- **Amateur Bands 160m - 10m.**
- **General Coverage Receiver.**
- **105db Dynamic Range.**
- **100W Output (40w A.M.)**
- **32 Memories.**
- **Electronic Keyer.**
- **CW Semi/Full Break-in.**
- **HM36 Microphone.**

The ICOM IC-751A was created for the ham operator who demands high performance whether entering contests, chasing DX or just simply enjoying the shortwave bands. It is an all mode solid state transceiver with a host of features designed for the crowded HF bands of today.

Additional features include 9MHz notch filter, adjustable AGC, noise blanker, RIT and XIT. A receiver pre-amp and attenuator provides additional control when required. The FL32 9MHz/500Hz CW filter is fitted as standard with CW sidetone on Rx and TX modes. On SSB the new FL80 2.4Khz high shape factor filter is fitted.

The transmitter is rated for full 100% duty cycle with a high performance compressor for better audio clarity. With 32 memory channels and twin VFO's, scanning of frequency and memories is possible from the transceiver or the HM36 microphone supplied.

The IC-751A is supplied for 12v operation but can be used with either internal or external A.C. power supply. It is fully compatible with ICOM auto units such as the IC-2KL linear amplifier and the AT500/100 antenna tuners.

Options available:- PS35 internal AC power supply, PS15 external AC power supply, EX310 voice synthesizer, SM8 desk microphone and SP3 external loudspeaker.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 0900-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

Despatch: Despatch on same day whenever possible.

Visa & Mastercard: Telephone orders taken by our mail order dept. instant credit & interest-free H.P.



ARROW ELECTRONICS LTD

HEAD OFFICE 5 The Street, Hatfield Peverel
(Nr Chelmsford) Essex
Tel: 0245 381626
0245 381673
FAX: 0245 381436

GLASGOW SHOWROOMS
Unit 17, Six Harmony Row,
Govan, Glasgow G51 3BA
Tel: 041 445 3060
8.30-5.30 Mon-Fri. Late nite Thurs 7pm

Hours: 9-5 Mon-Sat. Closed Thursday

BEST SCANNER RANGE IN UK!

Yes the most comprehensive range of Scanners and Specialist airband receivers both handheld, mobile and Homebased with books, aeriels, accessories.
Send SAE for our "AIRSHOP" list...

THE BEST DEAL IN AMATEUR RADIO
ALL MAJOR BRANDS AT DISCOUNT PRICES*
AVAILABLE NATIONWIDE - CALL ANY NUMBER FOR FAST EFFICIENT SERVICE.

NORTH WALES
John Lewis,
Tel: Anglesey
0248 714657
(Latest 8.30pm)

WIGAN
Jim Cook,
Tel: 0942
713405 (day)

LEICESTER
Dave Foster,
Tel: 0533 608189
(Latest 8.30pm)

Send SAE for our 'COMPUTARIG'
listings of used equipment available
nationwide. We will sell your unwanted
rig 10% commission.

ACCESS - VISA - CREDIT SALES (HP) - PROMPT MAIL ORDER



R. N. Electronics

Professionally designed equipment for Amateurs

TRANSVERTERS

- 144/50 MHz 25w p.e.p. £189 + £4 p&p. Use with an FT290 or similar 2m transceiver, for the opportunity to work U.S.A., Africa, Japan, Australia, etc. In fact almost anywhere in the world.
- 28/50 MHz 25w p.e.p. £199 + £4 p&p
- 145/70 MHz 25w p.e.p. £239 + £4 p&p
- 145/70 MHz 10w p.e.p. £199 + £4 p&p
- 28/70 MHz 10w p.e.p. £199 + £4 p&p
- 7dB Switched Attenuator £22 + £2 p&p

POWER AMPLIFIERS

- RN690 P.A. £75 + £4 p&p
- Add to your dedicated rig to give 25w p.e.p.

RECEIVE CONVERTERS

10M receive, 2M I.F. With thru switching on transmit use with 6m transverter and work 10m/6m Crossband £45 + £2 p&p

RECEIVE ONLY CONVERTERS

2m IF for 4m, 6m, or 10m, receive £39 each + £2 p&p each
10m IF for 2m, 4m or 6m receive £39 each + £2 p&p each

PRE AMPLIFIERS

Low noise (<1 dB) GaAs FET Pre-amplifiers for 6m, 4m and 2 metres. RF or DC through switching (Max 100w pep).

- Indoor boxed unit £36 + £2 p&p
- Masthead (line powered) with indoor DC feed unit £69 + £4 p&p

MET. ANTENNAS

50MHz 3 el. £42.95, 5 el £64.40, 70MHz 3 el. £37.30 p&p £4.50

NAVICO 2m FM MOBILES

AMR 1000 25/5w 12.5/25KHz 2 Metre FM Mobile £247.25 + £4 p&p
AMR 1000S 10 memory + full scanning £299.00 + £4 p&p
Top mount bracket for above £6.85 + £1.00 p&p
All prices include VAT

37 Long Ridings Ave, Hutton, Brentwood.
Essex CM13 1EE. Tel: 0277 214406



TX-3 RTTY/CW/ASCII TRANSCEIVE

The high performance, low cost system

Split-screen, type-ahead operation. Unbeatable features. Needs TIF1 interface or T.U. BBC, CBM64 tape £20, disc £22. SPECTRUM tape £35, +3 disc £37 inc adapter board (needs TIF1 or TU also).

RX-8 for the BBC computer

Receives screen and printer FAX charts and photos, HF and VHF PACKET, Colour SSTV, RTTY, AMTOR, CW, ASCII, UoSAT 1 & 2.

Receive them all with every possible feature, superb performance and ease of use. Full printer and disc support. The best receive system ever £259.00. FREE Klingensfuss Utility Guide for first 50 purchasers, DISCOUNT for RX-4 users.

More details in May issue or send for full information.

RX-4 RTTY/CW/SSTV/AMTOR RECEIVE

Performance, features and ease of use make this still a best-seller. Text and picture store, disc and printer support. Needs TIF1 interface. BBC, CBM64 tape £25, disc £27. VIC20 tape £25. SPECTRUM tape £40, +3 disc £42 inc adapter board (needs TIF1 also) or software-only version £25.

TIF1 INTERFACE Optimum HF and VHF performance with our software. 4-pole filtering and computer noise isolation for excellent reception. MIC, PTT and KEY TX outputs. Kit £20, ready-made, boxed with all connections £40. Available only with TX-3 or RX-4 software.

Also MORSE TUTOR £6, LOGBOOK £8, RAE MATHS £9 for BBC, CBM64, VIC 20, SPECTRUM. BBC LOCATOR with UK, Europe, World maps £10. All available on disc £2 extra.

technical software

Fron, Upper Llandwrog, Caernarfon LL54 7RF.



Tel: 0286 881886



QUARTZ CRYSTALS

QuartzLab MARKETING LTD

P.O. Box 19 Erith Kent DA8 1LH

Tel: (0322) 330830 Fax: (0322) 334904

Telex: 8813271 GECOMS - G
(Attention QUARTSLAB)
An SAE with all enquiries please
PRICES NOW INCLUDE VAT

STOCK CRYSTALS

CRYSTALS FOR 2 METRES
HC25 £2.70 FOR ONE CRYSTAL or £2.50 EACH FOR 2 OR MORE
TX CRYSTALS RX CRYSTALS R0-R7, S8-S23 and S32
12MHz 30 & 40pF 44MHz Series Res 1415MHz 30pF Scanner Crystals (S89 crystals £3.45)

HC6 £2.80 FOR ONE CRYSTAL £2.60 EACH FOR 2 OR MORE
TX CRYSTALS RX CRYSTALS
4MHz 44MHz Series res R0-R7, S11, S20-23 and S32

4 METRE CRYSTALS FOR 70.26 IN HC6/U AT £2.80 each
TX 8.78250 RX 20.78000
700CM CRYSTALS £2.50/pt or £3.30 each
For Pys PF 1 PF2 & PF70 series Wood & Douglas and FOK MULTI U11
SU8 (433.2) SU20 RB0 RB1 RB2 RB3 RB4 RB5 RB6 RB8 RB10 RB11
RB13 RB14 RB15 ALSO FOR MULTI U11 ONLY SU16 SU18
CONVERTER CRYSTALS IN HC18/U AT £3.30 each
22,000 38,666 42,000 96,000 101,000 101,500 105,666 116,000

FREQUENCY STANDARDS £3.20 each
HC6/U 1000kHz 10,000MHz
HC18/U 1000kHz 7,000MHz 10,000MHz 10,70MHz 48,000MHz 100,000MHz
TONEBURST I.F. & MPU CRYSTALS IN HC18 £2.60 each
7.168MHz (For 1750 Hz Tone), 10.245 (for 10.7 I.F.)
3.2768 4.000 5.0688 10.2450 14.3180 15.0000

YAESU CRYSTALS FOR FT101 & FT901 & etc £4.60 each
Many available ex stock (A list is available on request please send SAE)
Full list available on request, please send SAE
PRICES NOW INCLUDE VAT

MADE TO ORDER CRYSTALS

FUNDAMENTALS FREQUENCY RANGE	PRICE	OVERTONES FREQUENCY RANGE	PRICE
1 TO 15MHz	£12.40	3rd OVT 21.00 TO 65.00MHz	£5.25
1.5 TO 2.0MHz	£5.90	5th OVT 60.00 TO 110.00MHz	£5.90
2.0 TO 6.0MHz	£5.50	5th OVT 110.00 TO 125.00MHz	£8.60
6 TO 21MHz	£5.25	7th OVT 125.00 TO 175.00MHz	£11.60
21 TO 25MHz	£7.50		

DELIVERY
2.0 to 175.0MHz 2 weeks approx. 1 TO 1,499MHz 3 to 4 weeks
Unless otherwise requested fundamentals will be supplied for 30 pF load capacities and overtones for series resonant operation
HOLDERS - PLEASE SPECIFY WHEN ORDERING - else HC25/U supplied for XTALS above 3MHz

HC6/U & HC33/U 1-175MHz
HC18/U & HC25/U 2-175MHz
HC17 Add £0.50 HC45 Add £3.75

DISCOUNTS Price on application for 10+ units to same frequency/spec or bulk purchases of mixed frequencies
COMMERCIAL CRYSTALS: available on fast delivery and at competitive prices
EMERGENCY SERVICE: FOR XTALS 1 to 175MHz. Add the surcharge for each XTAL. Days refer to working days: 4 days + £12, 6 days + £17, 8 days + £25, 13 days + £33

CRYSTAL SOCKETS HC25 (0.25 ea) HC6 (0.30 ea) MINIMUM ORDER CHARGE £1.50 unless ordered with crystals
TERMS: Cash with order post inc. to UK & Ireland. Cheques & PO's to QSL LTD

PRICES NOW INCLUDE VAT

ARE

COMMUNICATIONS

THE SHOP WITH THE SMILE

Our policy of direct imports of Yaesu and Kenwood ensure cheaper prices to the radio amateur.



"BERNIE — I HEAR WE HAVE A SPECIAL PRICE ON THE NEW STANDARD RECEIVER"



"YES, THE AX-100 WITH VDU DISPLAY AT £499 INC VAT"

TS680S

The fabulous TS680S. General Coverage, Multimode, now that SIX Metres is open, there is no better time to buy. Discounted price £929.00 including FREE microphone MC43S.

Also available the TS140S without 6m, £799.00.



PHONE 01-997 4476

TS440S

Similar to the TS140/680S, but with additional "base station enhancements", the ever popular TS440S continues to be a best seller. At our discounted prices of only £1199 with ATU and £1039 without, can you really resist the temptation?



PHONE 01-997 4476

IC735/725

For the ICOM enthusiast, the IC735 is probably the most popular HF transceiver available under £1K. Still available at a very competitive price. Phone for details.



ICOM have now introduced the new IC725 as an economy version. Available from stock at only £749.00

PHONE 01-997 4476

FINAL. FINAL

I hope that our recent adverts have finally put to rest the adverse criticism which has been fired at us by the official importers of Kenwood and Yaesu about our direct imports. Quite simply, we buy our Yaesu and Kenwood outside the U.K. Because we pay less and if we pay less you pay less. Obviously, the official distributors do not like our policies as they compete strongly with the monopoly which has been created by manufacturers' policies, but to suggest that direct imports by us, or any other dealer, can only spell trouble for the amateur is total rubbish — Kenwood is made by Kenwood and Yaesu is made by Yaesu whoever imports it....B&B.

SO HERE SURELY MUST BE THE ULTIMATE IN HAND-HELDS.

The YAESU FT 728 or FT 470

Both available. Both are UK spec

But the FT 748 will receive out of band, the FT 470 will not.



FEATURES:

- Full duplex operation
 - Monitor both 2/70 at the same time
 - Dual display
 - Full 5 watts output capability
 - Programmable power save
 - Auto shut-off
 - FT23R/73R accessory compatible.
- List price slashed!!!
£ phone!

See them all at the Rallies

Opening Hours Monday-Friday 9.30 to 5.30
NOW OPEN SATURDAY MORNINGS 10.00-1pm



ARE Communications Limited, 6 Royal Parade,
Hangar Lane, Ealing, London W5A 1ET, England
Fax: 01-991 2565 Telex 94016185 AREC G

Tel: 01-997 4476

0272
557732
BRISTOL

G1DFK
G2BAR
Radio Communications
Amateur P.M.R. Marine

UPPINGTON

HAM RADIO SUPPLIES + TEN-TEC + YAESU



TEN-TEC CORSAIR II
£1200.00 inc. carr.

**TEN-TEC POWER SUPPLY
& SPEAKER**
£215.00 inc. carr.

CONTINENTAL SERVICE FOR EEC COUNTRIES

Cushcraft	THE G5RV	2 Element Beams
AS-3SS 3 Element Beam	DIPLOLE	70 cms £4.95 P&P 3.00
A3 4 Element Tribander Beam	1/2 SIZE	2 mtrs £5.25 P&P 3.00
10-3CD 3 Element 10m Monobander	40-10 MTRS	4 mtrs £12.95 P&P 3.00
15-3CD 3 Element 15m Monobander	£14.50	6 mtrs £14.95 P&P 3.50
20-3CD 3 Element 20m Monobander	+ £2.50 P&P	10 mtrs £39.95 P&P 4.00
Butternut	FULL SIZE	Antenna Rotators
HF6VX 6 Band Vertical Antenna	80-10 MTRS	G-400HC £169.00
HF2V 8040 meter Vertical	£16.50	AR50 £149.00
A 182HF6V 1712m Add on kit	+ £2.50 P&P	CD45 £219.00
20MRK HF2V 20m Kit		G-500RC £219.00
MFJ 962B 1.5 kW Versatuner		G-2000 £445.000
MFJ 949C 300W Versatuner		G-400 £149.95
MFJ 300 Watt Basic ATU		G-500 £149.95
MFJ 1601 Random Wire Tuner		
MFJ300 watt dummy load		
MFJRF Noise Bridge		
MFJ 815 2KW Cress needle SWR/Power meter		

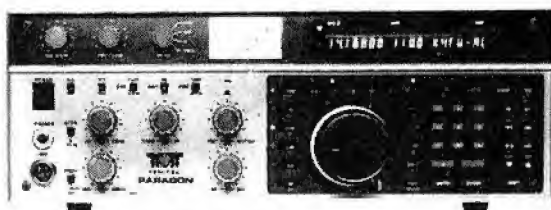
**GAMMA MATCHED
3 ELEMENT HF YAGIS**

10 MTR £95.00
15 MTR £125.00
20 MTR £155.00

INC
VAT
AND
CARRIAGE

TEL: (0272) 557732 12-14 PENNYWELL RD, BRISTOL BS5 0TJ

THE TEN-TEC PARAGON Synthesized Transceiver



This general coverage all mode receiver tunes from 100KHz to 29.9999 MHz. Modes USB, LSB, CW, FSK, AM, (FM optional). Sensitivity SB/CW/RTTY 0.15uV. Dynamic range: 100dB on SSB. Blocking and 3rd order intercept, very impressive figures. Transmitter 200 watts D.C. Input. CW Sidetone, Speech compression.

Write or phone for details of the PARAGON or ARGOSY II 100w Transceiver, CORSAIR II 200w Transceiver, CENTURY 22 CW only Transceiver and other TEN-TEC products.

We also stock KW Tapes & Dipoles; Antenna switches; Baluns; Fritzal Baluns; Butternut & Cushcraft Beams and Verticals. MFJ (U.S.A.) ATU's; Packet Radio Terminal and RTTY/ASCII/CW computer interface etc.

KW COMMUNICATIONS LTD,

Vanguard Works, Jenkins Dale, Chatham, Kent ME4 5RT
Tel: (0634) 815173. Telex: 965834

DEE COMM

AMATEUR RADIO
PRODUCTS

SPECIALIST AERIAL MANUFACTURERS
AMATEUR AND PMR
A SMALL SELECTION OF OUR AERIALS

3 Element H.F. Monoband Yagi's
10 Mtr £85 15 Mtr £115 20 Mtr £145
G5RV fullsize £16.25 halfsize £14.25
2 Mtr Yagi's 5LY £17.95 5XY £29.95
8LY £24.94 8XY £37.95
4 Mtr Beams 3 Ele £25 5 Ele £35
6 Mtr Beams 3 Ele £29 5 Ele £39
1000W Int dummy load £45

20 Ft Masts 3 section 1.5" x 10g £30 2" x 10g £60
2 Mtr Colinear 4.5 Dbd £36

We also stock HB9CV's, ZL Specials, Slim Jim's
2 Mtr & 6 Mtr Halo's, trap dipole kits, SWL aerials
and ATU's, discones, traps, baluns, copper wire,
insulators, dipole centres, rope, spreaders.
Winches 400lb £12.95 800lb £16.95 1000lb £19.95
1200lb £22.95 1400lb £24.95.

Wall brackets, fixing bolts, u bolts and mast clamps guy rings,
thimbles, turnbuckles and rope grips and large range of
tuning caps & roller coasters etc.

As you can see all our products are too numerous to mention.
Send £1 refundable against any purchase for our full
catalogue and price list.

TEL: 0384 480565

Visa and Access

TRADE ENQUIRIES WELCOME

SEE YOU AT YOUR LOCAL RALLY

**P&P AT COST
PLEASE PHONE
FOR DETAILS**

J. BIRKETT

25 The Street
LINCOLN LN2 1JF
Tel. (0522) 20767

EX-MILITARY COMMUNICATION RECEIVER type R210 2 to 16 Mhz in 7 switched bands with BFO, 10-100KHz
CRYSTAL CALIBRATOR, CW FILTER, NOISE LIMITER, AERIAL INPUTS 80 Ohm dipole, long wire or whip with
loudspeaker 240 volt AC power pack and pair of light weight headphones @ £79.80 (carr £85) EX-MILITARY
R210 in a converted condition @ £50 (carr £56) AIR SPACED VARIABLE CAPACITORS with slow motion drive
200 + 350p.f. @ £2.50, 250 + 250 + 20 + 20p.f. @ £2.50, 170 + 380p.f. @ £2.50, DIRECT DRIVE 10 + 10 +
20p.f. @ £1.50, 125 + 125p.f. @ £1.95, 200 + 220p.f. @ £2.50, 15 x 15p.f. @ £2.50, C804 types Sp.1. @ £1.95,
10p.f. @ £1.95, 125 + 125p.f. @ £2.50, 25p.f. @ £2.50, 50p.f. @ £2.50, 100p.f. @ £2.95, 150p.f. @ £1.95,
COMPUTER PRESS TO MAKE P.C. SWITCHES @ 25 for £1.50, SEI CRYSTAL FILTER type QC 1318 AC 1.4MHz Bw 3
kHz @ £3.50, SILICON EX DUAL FET VCR11R1 @ 4 for £1, AMERICAN WOODEN ADJUSTABLES TRIPPODS up to 8'
approx suitable for Dishes, Telescopes etc callers only @ £10, VALVE HOLDERS without skirt B7G @ 20p B9A
@ 20p Ux5 @ 30p, B9D PL519 type ceramic @ 30p 00V06 40A type ceramic @ 75p, with skirt B7G B9A
@ 20p each, 200 ASSORTED MINIATURE MULLARD POLYESTER CAPACITOR @ £1, WIRE END CAPACITORS 0.1uf
400VW @ 10p, 10VVF 450VW @ 45p, RF POWER TRANSISTORS BLY97 @ £3, BFR64 @ £4, 18 to 24 volt 3'
AXIAL FANS @ £2.95, DPDT TOGGLE SWITCHES @ 5 for £1, PMR TRANSCEIVERS PVE Dash Mount W15FM 79 to
110 MHz @ £15 (P&P £2), DYMAR 16 Channel 25 Watt Dash Mounting FM 79 to 110MHz @ £15 (P&P £3),
STORNO BOOT MOUNTING 10 Channel @ £8.50, (P&P £3).

ACCESS AND BARCLAY CARDS ACCEPTED.

P.P. 60p UNDER £5.00 OVER FREE, UNLESS STATED OTHERWISE.

C.M. HOWES AND WOOD AND DOUGLAS KITS AVAILABLE BY POST FOR CALLERS.



HATELY ANTENNA TECHNOLOGY GM3HAT

1 Kenfield Place, Aberdeen AB1 7UW, Scotland.

TELEPHONE: Evenings 6.30-9.30 (0224) 316004

or RSGB CARD

The COMPLETE RANGE of HF ANTENNAS WHATEVER YOUR SITUATION

PLENTY of GARDEN SPACE DIPOLE of DELIGHT
Monoband or Multiband. Highly Efficient, Quiet Background, No Need to TUNE, Fantastic Reputation,
Thousands Sold. All kinds of length and Price from £12 to £80.

CAPACITOR LOOP

The MOST EFFICIENT yet SMALL SIZED antenna for MONOBAND operation. Models for 20m and 15m.

LIMITED SITE or APARTMENT

CROSSED FIELD ANTENNA

All Bands 80m to 10m. Sensational new system (Patents Applied for) using POYNTING VECTOR
SYNTHESIS. Highly Efficient, Receives and Transmits, Broadband, Minimal TVI problems, Low VSWR.
Can operate inside a loft, or be placed anywhere on a ROOF, so small that planning problems solved.

Send 4 First Class Stamps (or 3 IRC's) for full Details and Prices.

Proprietor:

Maurice C Hately, M Sc FREE Chartered Electrical Engineer, Licensed 1950, now GM3HAT.

PACKET RADIO FROM THE EXPERTS

AMDAT is now in its fourth year of supplying and supporting Packet Radio equipment. Before you buy packet equipment from someone else ask if they can provide the radio and computer leads with the software necessary for your computer. When they look at you blankly put the TNC back and give AMDAT a ring. Come to the specialists for your TNC and accessories.

PACKET TNCs

TINY 2 + with mailbox	£119
KPC2 HF/VHF + WEFAX	£159
KPC4 DUAL PORT	£225
MULTI MODES	
MFJ 1278 9 modes	£229
TX/RX of FAX + SSTV inc mailbox	
KAM with mailbox	£265
inc KA-NODE	

ACCESSORIES

We stock leads to connect the TNCs to most radios and computers. Software available for many computers.

PC TNCs

DRSI Type 1 VHF+HF	£129
HF MODEM for above	£79
G3RUH MODEM for above	£95
DRSI Type 2 Dual VHF	£159

DRSI cards are shipped with all software needed inc split screen user software, G8BPQ The Node software and AA4RE BBS.

BBC EPROM

AMFAX eeprom	£19.95
Terminal + FAX on screen	
Prices inc VAT, p+p extra	
Prices subject to change	

AMDAT

Crofters, Harry Stoke Road
Stoke Gifford,
Bristol BS12 6QH
(0272) 699352/559398

CREDIT
AVAILABLE



SPECTRUM COMMUNICATIONS

MANUFACTURERS OF RADIO EQUIPMENT AND KITS

	PCB KIT	BOX KIT	BOX BUILT
WEATHER SATELLITE RECEIVER , good immunity to paging. Set of 5 crystals for WSRX £25.	£52.50	£121.55	£162.50
RECEIVE CONVERTERS , sensitive, low noise, 2 or 10m IF. Types RC2-10, RC4-10, RC6-10, RC6-2, RC4-2.	£17.25	£29.25	£41.00
TRANSMIT CONVERTERS , 500mW out, FM/SSB/CW, 2 or 10m drive. Types TC2-10, TC4-10, TC6-10, TC6-2, TC4-2.	£25.00	£37.00	£50.50
NEW SINGLE BOARD TRANSVERTER , 500mW out, 2 or 10m drive. Types TRC4-10, TRC6-10, TRC6-2.	£49.00 £55.00	£64.00 £70.00	£99.00 £105.00
Type TRC2-10 with repeater shift and crystal Buffer (B) unit for TRC's for low drive on 10m or Interface (I) unit for 250mW to 5W drive on 2m, add	£8.00	£8.00	£15.00
TRANSMIT AMPLIFIERS , for TRC's 0.5W in 25W out, Types TA2S2, TA4S2, TA6S2	£46.50	£58.50	£72.75
TRANSMIT AMPLIFIERS , for MEON etc, 0.5W in 25W out, Types TA2U2, TA4U2, TA6U2	£41.25	£45.00	£59.25
TRANSMIT AMPLIFIERS , for FT290, FT690 etc, 2.5W in 25W out. Types TA2S1, TA4S1, TA6S1.	£33.00	£39.00	49.50
RECEIVE PREAMPS , switched, 20dB gain, low noise, 100W handling. Types RP2S, RP4S, RP6S, RP10S	£14.75	£25.00	£35.50

MULTIMODE CB CONVERSION KITS, for all popular types, phone for price and details.

	PCB BUILT	FITTED
CB to 10FM CONVERSION for rigs with LC7137 or TC9119, SC29	£18.50	£31.50
CONVERSION for rigs with MM55108, type SC29F	£15.00	£28.00
FM CONVERSIONS for HF rigs with SSB/CW/AM, type FD311X & FM2000	£64.00	£108.00
FM CONVERSIONS for HF rigs with SSB/CW only, FD311X & FM3000	£74.00	£118.00
NOISE SQUELCH , cure for FM background noise, type NS1000	£14.00	£18.50
FREQUENCY MOD-DEMOC , quality FM add-on for AM CB's, type FM455	£12.25	£21.25

Fitted prices include carriage on the rig

MANY OTHER KITS FOR AMATEUR AND CB, SEND SAE FOR LIST PLEASE

VAT & P&P INC PRICES
Delivery within 14 days if available.
24 hr answering.

SHOP TIMES:
9 am-1 pm & 2 pm-5 pm TUES-FRI
9 am-1 pm & 2 pm-4 pm SAT
CLOSED SUNDAY & MONDAY



UNIT B6, MARABOUT INDUSTRIAL ESTATE,
DORCHESTER, DORSET. TEL: 0305 62250



Bredhurst electronics



BREDHURST ELECTRONICS LTD.
High St, Handcross, W. Sx. RH17 6BW
(0444) 400786

SITUATED AT SOUTHERN END OF M23—EASY ACCESS TO M25 AND SOUTH LONDON

RECEIVERS	
HF225	£385.00
ICR71	£855.00
RC2000	£595.00
V210 VHF Converter	£161.00
FRG8800	£649.00
FRV8800 VHF Converter	£100.00
RS000	£875.00
HF TRANSCEIVERS	
TS940s	£1995.00
TS440s	£1138.00
TS140s	£862.00
TS680s	£985.00
FT1980	£1795.00
FT167GX	£1599.00
FT175GX2	£969.00
FT174GX	£659.00
IC765	£2499.00
IC751A	£1500.00
IC735	£979.00
IC725	£759.00
2M TRANCEIVERS	
TH25E	£238.00
TH205E	£199.00
TH215E	£228.00
TS711E	£896.00
FT751E	£599.00
TM221ES	£317.00
TM231E	£289.00
FT73R + FNB10	£243.00
FT411 + FNB10	£259.00
FT290R II	£429.00
FT211RH	£309.00
FT212RH	£349.00
IC2GE	£265.00
IC Micro 2	£249.00
IC02E	£279.00
IC290D	£559.00
IC228H	£385.00
IC275E Inc PSU	£1069.00

70cms TRANSCEIVERS	
TS 811E	£996.00
TR 851E	£699.00
TM 421ES	£352.00
TH 405E	£245.00
TH 415E	£268.00
FT 73R + FNB10	£263.00
FT 790RH	£499.00
FT 711RH	£349.00
FT 712RH	£375.00
IC 4GE	£299.00
IC MICRO4	£299.00
IC 04E	£316.00
IC 448E	£429.00
DUAL BAND TRANCEIVERS	
TM 721E	£699.00
TS 750E	£1495.00
FT470R + FNB10	£423.50
FT 736R	£1359.00
FT 470RH	£675.00
FT470	£423.50
IC 32E	£399.00
IC 3210E	£499.00
SCANNING RECEIVERS	
IC R7000	£989.00
FRG 9600M	£509.00
RZ1	£465.00
AR 2002	£487.00
R 535 Airband	£249.00
ANTENNA TUNER UNITS	
FRT 7700	£59.00
FC 75A/AT	£349.00
AT 230	£208.00
AT 250	£366.00
IC AT 100	£379.00
MFJ 941D	£105.00
MFJ 949C	£158.00

DATONG	
AD370 Active Antenna	£77.62 3.00
FL3 Multimode	£145.54 2.00
D70 Morse Tutor	£63.40 2.00
ASP Speech processor	£93.15 2.00

CO-AXIAL SWITCHES	
SA450 2 way SO239	£19.49 1.50
SA450N 2 way N	£26.99 1.50
Drae 3 way SO239	£18.69 1.50
Drae 3 way N	£24.15 1.50
CS4 4 way BNC	£30.39 1.50
MFJ-1701 6 way SO239	£30.72 1.50

POWER SUPPLIES	
BNOS 12/5E	£57.50 3.00
BNOS 12/20E	£132.25 3.00
DRAE 6 amp	£78.72 3.00
DRAE 12 amp	£104.71 5.00
DRAE 24 amp	£151.34 5.00

HAND HELD RECEIVERS	
R53/S Airband	£69.00 2.00
Sony Air 7	£249.00 2.00
Win108 Airband	£175.00 2.00
AOR AR900	£235.00 2.00

SEE THE NEW RANGE OF
PALOMAR ANCILLARIES
IMPORTED FROM USA
HERE NOW!

GOODS NORMALLY
DESPATCHED WITHIN 24 HRS
PRICES CORRECT AT TIME OF
GOING TO PRESS — E&OE
MAIL ORDER & RETAIL

ANTENNA RANGE	
J Beam "Minimax" — Tribander	£361.00
J Beam TB3 MK3 — Tribander	£348.00
Butternut HF6VX	£159.00
Butternut HF2V	£142.00
Cushcraft A3 Tribander	£283.00
Cuscraft 2M 215WB	£86.25
Tonna 20505 5 ele 50mhz	£50.72
Tonna 20809 9 ele 144mhz	£33.12
G Whip tribander	£41.00
MORSE KEYS	
Kent Morse key kits	£29.50 2.50
Kent Twin paddle kits	£38.50 2.50
H. Mount MK704	£20.00 2.00
H. Mount HK706	£22.00 2.00
Vibroplex original std	£70.54 2.50
Vibroplex iambic std	£66.33 2.50
Benchner BY2 Chrome base	£76.97 2.50
FILTERS	
AKD HPF1	£6.75 1.00
AKD Band Breaker	£6.75 1.00
AKD Noise Filter	£7.75 1.00
BNOS Low pass filter 6m	£29.95 1.50
LF30A Low pass filter	£32.25 2.00
ANTENNA BITS	
Hi-Q Balun 1:1 5KW PEP	£13.95 1.50
Bicomm Balun 4:1 1kW	£13.80 1.50
Bicomm 7 1MHz Epoxy Taps (pair)	£10.95 1.50
Self Amalgamating Tape 10M x 25MM	£4.25 0.75
T piece polyprop Dipole centre	£1.60 0.25
Small ceramic egg insulators	£0.65 0.20
Large ceramic egg insulators	£0.85 0.20
CABLES ETC.	
URM 67 low loss coax 50 ohm per metre	£0.95 0.25
UR 76 50 ohm coax dia 5mm per metre	£0.35 0.10
UR 70 70 ohm coax per metre	£0.35 0.10
UR 95 50 ohm coax dia 2.3mm per metre	£0.40 0.10
4mm Polyester Guy Rope 1400kg per metre	£0.25 0.10
50mtrs 16 swg hard drawn copper wire	£10.95 2.00
75 ohm Twin Feeder Light Duty per metre	£0.20 0.10
300 ohm Split Ribbon Cable per metre	£0.32 0.10

BREDHURST ELECTRONICS LTD, HIGH ST, HANDCROSS, W. SUSSEX RH17 6BW (0444) 400786
Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm

ALTRON COMMUNICATION EQUIPMENT

ALWAYS CHOSEN BY PROFESSIONALS AND DISCERNING RADIO AMATEURS.

**COMPACT LATTICE TOWERS
SLIMLINE TUBULAR MASTS**

Telescopic—Tiltover, Fixed—Mobile from 3M to 60M. Over 50 Models, suitable for a wide range of civil and military applications such as:

- Radio Communications
- Amateur Radio
- CCTV and Surveillance
- Meteorological Monitoring
- Aero & Marine Nav Aids
- Flood Lighting etc.

Purpose designed using 4-5m and 3m section modules for low retracted heights and cost effective shipping. Engineered to B.S.I. standards and hot dip galvanised to BS729 for protection. Wind loads are based on BS CP3 CHAP V PT 2 1972 for wind speeds up to 100mph/160kph. (BS8100).

ANTENNAS

AQ6-20 "SPACE SAVER" THE COMPACT 4 BANDER THAT IS DIFFERENT. 2, 3 OR 4 ELEMENTS 6, 10, 15 AND 20M.

Unique Fully Sealed Coils.
Hi-Q—Close Coupled capacity hat loaded Yagi with optimized performance. Ideal for small spaces. Send for full Spec. sheet. NOW!

**QUALITY
RELIABILITY
KNOW HOW**

WE DESIGN—WE MAKE—WE SELL—DIRECT.
At manufacturers prices—you get best value.
European Distributor
Classic International
Roermond (NL) 04750-27390
SEND S.A.E. FOR FURTHER DETAILS AND PRICES OF ALTRON PRODUCTS.

H.P. TERMS

ALLWELD ENGINEERING
Factory 6, 232 Selsdon Road,
South Croydon, Surrey, CR2 6PL.
Tel: 01-680 2995 (24 hr) 01-681 6734

SSTV FOR ATARI 520/1040 ST

BEYOND DOUBT THE FINEST COMPUTER DECODING OF SSTV WE HAVE SEEN!!

For the first time we offer a programme not written by ourselves. We always said that it would need an exceptional programme for us to take this step, and this programme is exceptional!!

The detail and clarity of the display has to be seen. This programme is a must for **ATARI ST** owners.

The programme features 10 picture stores as well as the facility of saving screens to disc, inverse pictures, change greys, etc. etc.

Supplied on disc complete with interface and ready to go. Simply connect to the extension speaker socket on your receiver.

Inc Leads **£35.00**
Programme only, on disc. **£10.00**

Full details of this and our other products forwarded on receipt of large S.A.E.

J.B.P. ELECTRONICS LTD.

Unit 45, Meadowmill Est, Dixon Street, Kidderminster DY10 1HH.

Tel: (0562) 753893

BRAND NEW COMPONENTS BY RETURN OF POST

VAT Inclusive Postage 25p (Free over £5). List Free

HIGH STABILITY MINIATURE FILM RESISTORS 5% Tolerance
1/4W E24 Series 0-51R to 10MΩ 1p (75p/100 one value) 0-125W E12 Series 10R to 1MΩ 2p
0-5W E24 Series 1R to 10MΩ 1p 1-0W E12 Series 4R7 to 10MΩ 5p
1W metal film 10R to 1MΩ 5% E12 series 2p 1% E24 series 3p
Mullard or equivalent Subminiature Ceramic Plate capacitors 100V E12 Series
2% 1-8pF to 47pF 3p 2% 56pF to 330pF 4p 10% 390pF to 4700pF 4p
Plate Ceramic Capacitors 50V working for vertical mounting
E12 Series from 22pF to 1000pF then E6 series 1k 5pF to 47k pF 2p. 0.1µF 1pF 3p
Miniature Polyester capacitors 250V working for vertical mounting
0-1, -015, -022, -033, -047, -068 4p. 0-10 (100V, 250V) 5p. 0-15 6p. 0-22 (100V, 250V) 6p.
0-33 8p. 0-47 (100V, 160V, 250V) 8p. 1-0 15p. 1-5 20p. 2-2 22p.

ELECTROLYTICS Wire Ended (Mkds/Volts)
47/50 5p 10/50 5p 47/16 6p 100/25 7p 220/25 8p 470/40 16p
1-0/50 5p 22/16 6p 47/25 6p 100/50 8p 220/50 10p 1000/15 15p
2-2/50 5p 22/25 6p 47/50 6p 150/16 7p 470/16 11p 1000/25 18p
4-7/50 5p 22/50 6p 100/16 7p 220/16 8p 470/25 11p 1000/35 22p

TAG ENDED CANS: 5000/30V £1.00 4700/16 25p. 4700/25V axial 70p.

TANTALUM BEAD ELECTROLYTICS Subminiature vertical Mounting (Mkds/Volts)

0-1/35 14p 2-2/35 15p 15/16 20p 22/16 30p 47/16 80p
0-22/35 14p 4-7/6 14p 15/25 35p 22/25 35p 68/3 30p
0-47/35 14p 4-7/25 15p 22/6 20p 33/10 30p 100/3 35p
1-0/35 14p 10/25 20p 22/10 25p 47-6 30p 220/16 £1.20

POLYSTYRENE Capacitors 63V working E12 Series Long Axial Wires

10pF to 820pF 3p 1kpf to 10kpf 4p 12kpf 5p

TRANSISTORS

BC107/8/9 12p BC547/8/9 8p BC183 183L 10p 8F195&7 10p 8FX88 25p
BC147/8/9 10p BC557/58/9 8p BC212L 10p 8FY50/51/52 20p 8SX19&20 15p
BC157/8/9 10p BC182L 184L 10p BCY70 15p 2N3055 50p BD135&6 25p

8 pin i.c.s. 741 20p 555 22p Holders 8 pin 9p 14 pin 12p 16 pin 14p 28 pin 25p 40 pin 40p

DIODES (p.i.v./amps)

75/25mA 1N4148 2p 800/1A 1N4006 6p 400/3A 1N5404 14p 115/15mA OA91 6p
100/1A 1N4002 4p 1000/1A 1N4007 7p 60/1-5A 1M1 5p 100/1A Bridge 25p
400/1A 1N4004 5p 1250/1A BY127 10p 50/1A 1N4001 3p 30/150mA AA143 8p

Zener Diodes E24 series 400mW. 3V3 to 33V to 33V 8p. 1 watt 3V9 to 33V 12p.

LEDs Red, Green, Yellow 3 & 5mm, 10p. 8mm, 35p. Grommets 3 & 5mm, 2p

Fuses 20mm glass 100mA to 5A. Q Blow 5p. A/Surge 8p. Holders 5p. (p.c. or chassis)

High speed p.c.b. drills 0-8, 1-0, 1-3, 1-5, & 2mm 30p 12V Drilling machines £7.00

The C.R. Supply co. 127 Chesterfield Rd, Sheffield S8 0RN. Tel: 557771

ANTENNES TONNA (F9FT) THE VHF/UHF ANTENNA SPECIALIST

50MHz	144/435MHz	POWER SPLITTERS
5 element.....£50.71(a)	9&19 element Oscar.....£61.07(a)	2 way 144MHz.....£48.36(b)
144MHz	1250MHz	4 way 144MHz.....£57.53(b)
4 element.....£29.39(a)	23 element.....£32.29(b)	2 way 435MHz.....£45.69(c)
4 element crossed.....£37.26(a)	4x23 ele - stacking frame -	4 way 435MHz.....£55.36(c)
9 element fixed.....£33.12(a)	power splitter.....£175.00(a)	2 way 1250MHz.....£38.35(c)
9 element portable.....£35.19(a)	1296MHz	4 way 1250MHz.....£43.36(c)
9 element crossed.....£52.10(a)	23 element.....£32.29(b)	2 way 1296MHz.....£38.35(c)
13 element.....£49.06(a)	4x23 ele - stacking frame -	4 way 1296MHz.....£43.36(c)
17 element.....£66.24(a)	power splitter.....£175.00(a)	2 way 2300MHz.....£38.35(c)
435MHz	55 element.....£49.27(a)	4 way 2300MHz.....£43.36(c)
9 element.....£30.43(a)	4x55 ele - stacking frame -	
19 element.....£36.64(a)	power splitter.....£250.00(a)	
19 element crossed.....£42.44(a)	2300MHz	
21 element 432MHz.....£47.61(a)	25 element.....£43.47(b)	
21 element ATV.....£47.61(a)		

All prices include VAT. Please add carriage (a) £5.00 (b) £2.20 (c) £1.20. U.K. MAINLAND ONLY. ACCESS or VISA cardholders telephone your order for immediate dispatch. Callers welcome, but by telephone appointment only, please. Send 50p for our catalogue which contains the full specifications.

RANDOM ELECTRONICS (R) SOLE U.K. DISTRIBUTOR
FREEPOST, ABINGDON, OXON, OX14 1BR. Tel: (0235) 23080 (24hrs)



As packet users will have noticed by now, many mailboxes across the country are at last available on UHF with GB7 callsigns. These licences are a great relief to some SysOp's who, in some instances, have had to wait nearly two years since first applying. The hope is to reduce the strain on the 2 metre system in highly populated areas with some linking as well as access ports becoming available on 70cm. Watch your local mailbox for details.

There are now a few links appearing on this band for mail forwarding purposes. With the assurances recently received from Cirkit concerning the continued supply of their Rx board and now the introduction of a new commercial transceiver by Kenwood, linking on this band is not as difficult as it would first appear.

At the last Packet Working Group meeting the Microwave Committee introduced the equipment they have adopted for use, favouring the Cirkit/RSGB set-up. On show were the 001 Driver board, 002 Amp board and the SPL1X phase modulator board. If you intend to build equipment for 1299MHz it is worth noting that the Microwave Committee hold Round Tables each year at Winchester, Sheffield and Martlesham. At each of these the facility is offered to help set up equipment with the correct test gear on hand - more details from time to time in the Microwaves column.

Grimsby ARC have been fortunate to have had a visit from Gordon Moore ZS6CBM (also G4BNT) who is the current chairman of the South African Radio League Packet Group. Gordon explained in great detail the progress of the packet network in South Africa and showed a proposal for an addressing system to be used there. The system is based on the ROSE networking software, a copy of which is available for the IBM and compatibles by sending a 360k formatted 5.25" disk to Barry Harvey G8RIW, 56 Oakwood Drive, Grimsby, Lincs DN37 9RN.

The London Digital Group met and re-formed the group with the SysOps from Area 3 (the packet network's equivalent to RSGB Zone

G). The main aim of the meeting was to discuss the improvement of mail transfer around and across the Capital. A new structure was agreed with part of the mail being carried on 1299MHz between five stations in the area. These are: GB7HHH, GB7HQQ, GB7HIU, GB7DGK and GB7NHU; parts of this link are already in operation with hopes to complete the final link by the time you read this. It is hoped that the new structure will greatly speed up messages from the south coast which previously had to cross a very heavily oversubscribed system in the London area.

Unfortunately the first Northern Network planning meeting to be held by YaxPak was unable to take place as planned. Information from Geoffrey Smith, G4AJJ, states that a meeting will take place with the North West Packet Group, to discuss the links towards Scotland. It was interesting to note how important some of these meetings between groups can be: Geoffrey pointed out that, due to technical problems, one of the Nodes in Scarborough had to close for a few days, resulting in a serious break in the network, with parts of the country (especially Scotland) being completely cut off from the rest of the network. These meetings should prove to be helpful in planning alternative routes for when this type of problem occurs.

In the world of ever-changing software for mailboxes, the latest versions (at the time of writing!) are, WORLI 10.08, G4YFB 2.14 (this one stops bulletins being repeated), and G8BPQ 3.2 (no more FRMR problems). This month I am pleased to be able to bring you the report on WORLI 10.08 which I am informed now supports G8BPQ node software. Thanks for this report are due to Martin Stubbs, G8IMB.

The version 10.08 which is currently in use is the latest in the line from the acknowledged creator of the packet BBS. His original offerings were written for use under CP/M on the Xerox 820, but for the last couple of years he has been writing for PC/MSDOS running on the IBM PC and clones. The software is written to run as a single user or for multi-user when run under Desqview. The great advantage of the code to the SysOp is in its frugal memory requirement. On a standard XT (NB having a V20 processor or equivalent) it is able to run 3 Mailbox windows on top of

This month continues the glossary with **M-P** not **M-R** as stated last month due to lack of space.

Mail-Forwarding – part of the mailbox system which allows messages to be sent in the form of mail to other mailboxes

Mailbox – a packet radio station which has a store and send facility. This station is the main access point for the USER to read and send his personal messages. Some mailboxes also have the facility for the transfer of software, as well as files containing useful information about local groups and clubs. A very few mailboxes have a facility called 'Round Table' which allows a conference of many amateurs to be conducted using the mailbox as a central point.

Message header – at the start of a mailbox message, before the data, there is a portion of information known as the header, or message header. It contains the message number, type of message, intended recipient and other routing information. The end user usually sees an abbreviated form of this.

Minimum shift keying - (MSK)
frequency shift keying where the shift in Hertz is equal to half the signalling rate in bits per second.

Modem – an electronic device that is a modulator/demodulator permitting digital equipment to use analog communications media for data communications.

Multiple connections - the term to establish and maintain connections with more than one station simultaneously.

Multiport – a station with the ability to receive and transmit on more than one operating frequency with possibly different parameters on each frequency.

NET.EXE - a TCP/IP implementation for the IBM written by Phil Karn KA9Q.

NET/ROM - a network and transport layer implementation for the TNC2 written by Ron Raikes, WA8DED and Mike Busch W6IXU.

Network – a system of

interconnected packet radio stations, designed for the efficient transfer of packets, over a distance greater than can be achieved by two directly connecting stations.

Node – a junction point within a network, may also have access to an alternative frequency or band.

Open Systems Interconnection Reference Model (OSI-RM) – see *RadCom*, Datacomms, June 1989 for a full explanation of the model.

Overhead – the non data portion of a packet, ie headers and flags.

Packet assembler/disassembler (PAD) – a device that receives data from a DTE and formats it into packet frames ready for transmission. The PAD also handles data received via the communication medium, extracts data from the packet frame, and then passes the information to a DTE.

Packet Radio Bulletin Board System (PBBS) – a BBS that is accessed via the packet radio system. Better known in this country as a Mailbox.

Parity - a method of checking accuracy of received characters. Its method is to add an extra bit so that the character will have either an odd or even number of bits, dependant on the type of parity used.

Path - the route between two packet stations, consisting of digipeaters and other packet stations.

Polling protocol – the protocol where each station is checked at regular intervals by a controller, in a specific order, to see if it is ready to send data. Once polled if the station has data to send it will then send it. The controller then checks the next station in the system.

Protocol – a recognized set of procedures.

Protocol Identifier Field (PID) – the field in an AX.25 frame that indicates the type of network layer protocol in use.

Next month R-Z which will complete the glossary.

G8BPQ's TheNode software. Each window knows of the other's existence and therefore each is accessible from all bands in use.

The software incorporates a very nice file directory facility which allows a number of file areas to be set up and given meaningful titles. Import and export facilities include the ability to transfer mail to and from TCP/IP. A number of servers have been written in the UK which replicate the REQDIR and REQFI

facilities found in WA7MBL.

A Round Table facility is included in the code which automatically distributes an incoming packet to all other users who are logged on. However this facility is not available when run with GBBPQ TheNode. The Rate of development of the software has been amazing over the last year, with new issues appearing every few weeks, this seems to be due to the author's willingness to modify the code as required.

RON BROADBENT G3AAJ

94 Herongate Road, Wanstead Park,
London E12 5EQ. 01-989-6741

By the time you read this early in August, Dataspace '89 will have been and gone. It should have been a great success, although at the time of writing this column, on 27 June, very few data addicts were booked to attend. On the other hand, about 120 satellite fans from last year's event were on the list for most of the days. One thing is certain - if we do not get a positive response from the Data/Packet fraternity this OM will not be putting any effort towards a meeting for any RSGB event again. Why should I bang my head against a brick wall for the third time? Still it's early days yet; who knows, we may have a flood of radio amateurs who suddenly find out that the event is about to happen.

A strange satellite on the 2M band

During the last few weeks a number of amateurs have been alerted to a signal or two, with Doppler, on the 435MHz, 70cm band. As is usual in these circumstances, the Amstat-UK Nets can access times, frequencies, periods and predictions for the next few satellites due to be in range; a lot of this work being carried out by G3CAG, G4CUO out front, plus one or two others out of sight. And this information reveals that one of the satellites is the Polar Bear satellite launched by the USAF in November 1988. Its designation is 8688A, Cat.Number 17070, and it is a Transit Navigation Satellite with a period of 104 minutes.

The frequency is claimed to be 149.97MHz on transmit, so what is it doing transmitting a steady carrier on 70cm, right in the satellite band? By the time you read this a few questions will have been asked, via the back door, to the Red Brick Buildings in Washington Square. I will report on any outcome at a later date. Now all we have to do is identify the other two up there which are transmitting in an amateur band.

Elliptical orbital satellites

Oscar 10 and 13. Both of these birds are still giving good, if not excellent, signals both ways to the folk who take the trouble and time to stay up a bit later than usual, and are not afraid to transmit during TV hours. Funny that, with TV now on into the early hours, those folk who will not tackle the problem of TVI still stay off the air! They certainly cannot all wait until 3AM to do their

transmitting.

During a few hours on Oscar 13 this week I have heard and worked JAs and VEs with as much ease as being on 20m. A few QSOs were on SSB, but I also had a bash at the key, with good results. It's a shame to hear amateurs saying that to get a QSO on a satellite is hard work, and expensive.

Both remarks are very wrong. First it is like everything else in life - you have to learn first. Except for a few amateurs who were born with microphones in their big mouths most of us had to learn where the switch is to turn on the receiver, and then find a signal. Except for shouting at the local FM repeater most of us had a problem in working our first QSO via satellites. So why give up if you started to get keen? Second, there's cost. Rubbish. Most of today's amateurs have 2m capability and an HF receiver. Which means you can 'Two to Ten' by using the RS10/11 transponders (and soon RS12/13).

With the 2m TX/RX on SSB or CW, plus a transverter to put you into 70cm you can access Oscar 10 and 13. It will not be as easy as working your local voice box but you will have achieved something, even if only what not to do next time. You may have a problem with antennas, but then who doesn't. Try with what you have first, and then moan after you have had a go.

Local forum

This brings me to an offer that I have made to members of AMSAT-UK who suggest that we are all too far removed from the rank and file membership because we are "experts" ie, know the jargon! In fact I have recently and sadly been accused of purposely omitting new call-signs from the AMSAT Nets. Again, rubbish. However, I digress. I have suggested to the locals living within 25 miles of the A12/M11 Roundabout, which is about 7 minutes from my QTH, that I will run a regular satellite forum at a local venue (Smith's Best Yorkshire served), once a month, provided I get some response. The forum will be for discussion and learning - no politics or RSGB bashing - and must also have a few "experts" in attendance as well as newcomers to the satellite scene.

If interested please write to the above address.

RS12/13

During the early part of June we received a message from Europe, purported to come from Russian sources, that the transponders RS12/13 would definitely be launched in June. To date, they haven't.

Your scribe did, however, speak

with UA3CR on the twisted pair on, 26 June, and discovered after all that RS12/13 would not go up in June after all, but instead in "a few months' time." He promised to advise soonest by fax. It may, of course, be that we get egg on the face because the launch happened on 30 June; but I doubt it.

Schedules

Oscar 10

Can be accessed at all times when the Beacon on 145.810 is not FM'ing. At such times please desist. Other magazines please copy in your language to your own readers.

Oscar 13 - from 14 August 1989

Mode B - MA 003 to MA 160
Mode L - MA 160 to MA 200
Mode B - MA 200 to MA 240
Mode Off - MA 240 to MA 003
Mode S - MA 210 to MA 222

JAS-1

Mode JA - 16 Aug at 0240 to 1052
Mode D - 16 Aug at 1052 to 0200 on 19 Aug
Mode JA - 19 Aug at 0200 to 1012
Mode D - 19 Aug at 1012 to 0039 on 25 Aug
Mode JD - 25 Aug at 0039 to 0851
Mode D - 26 Aug at 0851 to 0053 on 27 Aug. Thence Mode JD

Signals have been excellent on JAS-1 for those who are prepared to put some effort into this satellite and its switch on/off times for packet and analogue modes. Only two people were on this satellite on 27 June, signals being loud and clear during the pass over UK.

Reports from users will be welcome.

Final

For those readers in the Birmingham area who wish to find out a little about satellites and how to use 'em. Book into, or listen on 144.280MHz Thursdays at 7pm local time. G4ULS has started up an Information Net on that frequency. It will only be of use if you get on and give input/output. Net on SSB at the low end of two metres. How many times do you now see the word two METERS printed for a band of frequencies? Too many times, I bet. Please note that the word for a unit of measurement, ie WAVELENGTH is METRES (at least it is in the UK and the rest of Europe). The word for a device that indicates Volts and Amps is a METER. OK it's different in the USA where they don't spell the English way. That's why halfpennyworth to the Government Warning that 90% of under 40 year-olds cannot spell in the language of this country. It includes some typesetters I know of.

MIKE DIXON G3PFR

'Woodstock', Grazebank, Norley,
Warrington, Cheshire WA6 8LL

Microwave Committee Business

The last Microwave Committee meeting was on Saturday 17 June. Heading the agenda was discussion on the Student/Novice licence and how this can best be supported in the two microwave bands nominated for the licence. The need for specially written publications, in the form of *Student Guides* was discussed at length and several ideas and designs noted as being suitable; there are still some items of equipment common to both the microwave bands and the lower frequency bands which need identification or design work before we can get down to the serious business of compiling guides. Any assistance with ideas for simple equipment - of any type in the 1.3 or 10GHz bands - would be welcomed by the committee. If you might have something to contribute, please drop us a line.

The Microwave Manager, G3WDG, reported on his recent attendance at the IARU Region 1 VHF Managers' meeting. The most significant revelation from the meeting was agreement from member societies to recommend that the narrowband section of 24GHz be moved from 24192/24194MHz down to 24048/24050MHz - an area which seemed free from restrictions in the majority of neighbouring countries and which could well become a 'primary' allocation. It is immediately adjacent to the commonly used wideband frequencies.

In the search for 'common' frequencies in the other bands (a true sign of the international nature of microwave operation these days!) it became apparent that we may have to abandon the remaining few harmonic relationships ($n \times 1152$) which still exist. What also became apparent was that some of the allocations currently regarded as 'exclusive' by various band users may need to lose this tag - a subject I've hinted at before. It can be quite an emotive subject, but is one which must be approached realistically in the face of increasing spectrum pressure and with WARC '92 close at hand.

The Committee is also anxious to try to set up a Round Table type meeting in the Midlands, similar to those held at Winchester, Sheffield, Martlesham and Leeds. There is a notable gap between north and south which we feel should be closed by a meeting in the middle!

BOB TREACHER BRS 32525
93 Elibank Road, Eltham, London
SE9 1QJ

been awarded a contest certificate as overall winner of the Listener Section of the March 144/432MHz Contest this year. He was also the leading listener on both bands.

Turning to HF Awards, I have received letters from two SWLs — 91410 and 92190 — about how to claim HF receiving awards. I have asked our HF Awards Manager, Steve, GW4BKG, to let me have some information. As soon as it arrives, I shall include necessary details in this column.

SWL view of VHF convention

Mick Toms has provided a few notes on the Convention. Packed, was his reaction, although the number of people thinned out considerably after lunch. He found the trade stands to be as good as ever, with many bargains to be had for those who were there early. Be met up with some old friends and acquaintances who only ever seem to be seen at rallies and conventions, plus some of the well-known operators who always seem to be working the DX Mick has a job to hear!

Mick sat in on lectures by G4ASR on 'DX for the beginner' and he noticed some very well-known faces in the audience (who could in no way be described as beginners!) and G3NAQ's Sporadic-E talk, which seemed to say what we know already, that Sporadic-E is very unpredictable.

ILA news

David Whitaker, BRS25429, reports that GW4QXB has offered to take over the White Rose LF Contest on behalf of the ILA, I await more

I still have a supply of my June QSL Manager's Lists available. If any readers are interested in receiving a copy, just send me £1 to cover copying and postage.

More award activity

Last month, I mentioned that I had been awarded the Society's first 200/30 Squares Award for 144MHz. Now I am advised by Ian, G4OUT, that Mick Toms, BRS31976, has been awarded sticker no. 24 for the 150/20 144MHz Award.

Ian was very impressed with many of the cards submitted by Mick which took him to the 150 mark. Included in those submitted were OY/LA6HL (IP62), ZB2IQ (IM76), TK5EP (JN41), SP9EWU (JO90), HG2NP/0 (KN07), LA1BEA (JO28), Y25IL (JO71) and SM2CEW (KP15). Mick has provided me with a map which shows what he has had confirmed so far.

Ian had also had to deal with a 25/10 Squares Award from yours truly for 50MHz. It was the first of its type to be issued to an SWL. Cards submitted for the Award included CT1WW, ZB2IQ, VE1YX, W2IDZ, OH1ZAA plus the nearer G,GM and GW squares.

Ian informs me that there are some new levels of award for the VHF/UHF bands. These increase the upper levels and fill in some of the large gaps too. Stickers are being printed. Full details will be released when this had been done.

Norman Henbrey, BRS28198 has

	Band (GHz)							
	1-3	2-3	3-4	5-7	10(W)	10(N)	24	47
Own/use equipment (%)	68	37	22	10	63	29	20	1-25
Best DX (km) recorded	1350	1260	903	971	256	500	126	—
Average QRK	38W	11W	3-5W	4W	5mW	1-5W	10mW	200mW
% less than /QRK	50	50	50	50	50	75	90	—
	10W	5W	600mW	2W	10mW	250mW	8mW	—

Any assistance in nominating (or offering) a venue would be appreciated. Clubs or other organisations who might feel able to 'host' such a meeting are invited to contact the Committee, via HQ.

Winchester Round Table

Ted, G4ELM, sent in a detailed report on happenings at the last Winchester Round Table, held at the IBA centre at Crawley Court on Sunday 4 June, by courtesy of the IBA and the arrangements made by Don, G3JHM.

The report is too comprehensive to reproduce here, but the main points can be summarised: attendance 22, with quite a large 'bring and buy' sale and informal exhibition of home-built equipment. The morning session included equipment alignment, a discussion on the 1989 Cumulatives and a resumé of Project Y.E.A.R. Out of these sessions came several points for Committee discussion and/or action — for instance, should the Cumulatives be timed to coincide with the IARU "DC to light" contests to maximise activity? Full discussion of contests is usually scheduled for autumn, in time to make arrangements for the next season, as they have to fit into the already crowded RSGB calendar/contests calendar. Another point which needs to be covered is the 'registration' of 144.330MHz and/or 144.175MHz as microwave calling/talkback channels. Views please!

Other points discussed were progress on various proposed beacons (notably Reigate and Basingstoke), the work of the Microwave Committee and the content of the *Newsletter* and column. The consensus opinion on the latter seems to be that the present 'style' of *RadCom* — I quote, "...rendered the Column useless. What was required was the 'old' level of design/circuit information and greater publicity for microwave activities generally to a wider audience." To some extent this criticism is justified, but as I've said before, as column compiler I can only report the technical and design work of others when it's reported to me; and don't forget that the *Newsletter* editors are in the same boat — reliant on readers for at least the major part of the input.

Finally it was announced that the IBA would soon commence operation of a beacon-type transmitter (100W ERP) on 12.05GHz as part of their experimental work on multipoint video distribution systems (MVDS) in the 12 to 20 and 30 to 60GHz regions, proposed in the Government Green Paper and mentioned here a couple of months ago.

The date of the next Round Table was agreed as Sunday, 24 September. Details from Don, G3JHM or Ted, G4ELM.

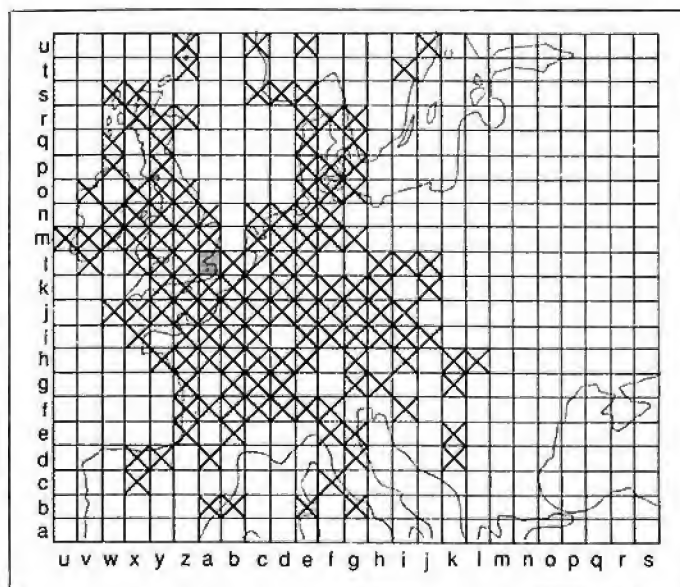
Microwave Newsletter

It has been suggested that, from time to time, I review briefly the contents of the *Newsletter* so that others may be aware of what is going on there: no, it is not a commercial 'plug' but another point arising from the Winchester Round Table! So here goes.

Issue 1/89 (April): in addition to the usual operating news and free members' adverts, it carried articles on 10GHz Gunns in tandem (to increase power output), the use of microwave oven magnetrons for QRO on 13cm, two pages of microwave portable site details and an introductory article entitled "The world above 1000 Gigs." Issue 2/89 (May/June) contained a similarly varied diet — a part-analysis of the 1988 *Newsletter* Questionnaire, two articles on two different types of dish feed (alternatives to the penny feed?) and a short practical article on the use of QRP (2mW) helium-neon lasers for communication. The author of the latter, Barry, G8AGN, would like to hear from anyone experimenting with light as a comms medium.

A few interesting statistics arising from the questionnaire are tabulated above. Of the replies, 51.3% of operators were professionally engaged in electronics, 38.5% were not and some 10% did not indicate. The most popular articles were those of a constructional or technical nature — by Murphy's Law, the very ones in shortest supply!

Cyril G3VVB's (see last month) attended beacon is on 1296.350MHz and both he and Dave, G6LEU, are on 1296.2000MHz from 2100 to 2130 local time. — Dep Ed.



Map showing the squares confirmed by Mick Toms BRS31976 on 144MHz which brought him a 150/20 Squares Award.

HILARY CLAYTONSMITH, G4JKS
115 Marshalswick Lane, St Albans,
Herts AL1 4UU

information. The latest newsletter mentions that membership is now at a very healthy level with around 600 members having joined the Association in the four years it has been in existence. A new membership list should be available by about the time you read this.

The highlight of the June 'Just Listening' magazine was an interesting article about routes for supersonic flights over Southern Britain and the English Channel. A QSL Guide was also an added bonus for members, which gave details of how to QSL.

SWL contests

The Barking Radio and Electronics Society have announced details of their 1989 Contest. It will run from 1300-1700 on Sunday 13 August on 144MHz. It is a 'County Multiplier' Contest and the Society hope that the event will attract some SWL logs — certificates will be available. Full details can be obtained from Mick Toms, who is acting as Contest Manager, by sending an sae to: 32 Wellington Road, Rayleigh, Essex SS6 8EZ.

Secondly, news from Owen, G4DFI, that the Cray Valley Radio Society are running their popular SWL Contest this year. It will be held in two sections over the weekends of 16/17 September (CW) and 23/24 September (SSB). The full rules can be obtained from G4DFI on receipt of a sae. His address is 28 Garden Avenue, Bexleyheath, Kent DA7 4LF. The Society hopes that many logs will be received from SWLs both at home and abroad.

Taking receiving equipment abroad

Mrs L A Reed, BRS87871, of Cheltenham wrote to ask about taking receivers abroad following the security clampdown after the Lockerbie disaster. I have discussed this with Society Headquarters and it appears that there is no official line. However, these guidelines should be followed — (i) take out any batteries and keep them separate; (ii) keep with hand luggage so that Customs can inspect easily; (iii) tell Customs that you are taking a receiver on the plane; (iv) give Customs every opportunity to inspect the receiver; (v) be open and honest.

Society staff have adopted this routine when travelling with radio equipment and have found Customs to be no problem. A word or warning, however, is that if you try to hide or obscure a receiver in baggage, you will undoubtedly encounter a good many problems. I hope this advice is of help to

BRS87871 and others who might be contemplating taking receiving equipment abroad.

Newcomers

I used to run a 'Newcomers' piece each month, but that fell by the wayside. In the hope that it will inspire a few of our newer members to write and tell us about themselves, I shall provide a few details about the two new listeners, mentioned earlier, who wanted advice about HF Awards.

First, we have Ian Armstrong, BRS92190, who has been keeping a log since mid-April. He uses a Panasonic DR49 receiver, a converter for 144MHz, SEM filter and homebrew 'L' match ATU. Wire antennas are in use on HF, while a Colinear and beam are available for 144MHz. At the time he wrote, he had heard around 60 countries on HF, including VU2DK, 9H3KD, 4X1AT, TF3CW and 4J1FS. He also monitors SSTV and has seen pictures from CT1UT.

Second, is Brian Biddle, BRS91410, who lives in Leicester and was most concerned about some of the operating habits heard on 144MHz. We will say little about that, but he asked why amateurs did not take more pride in their CQs. Brian remarked that he often has to listen two or three times to copy some call signs properly because of the language barrier, interference from adjacent frequencies or mainly because the proper phonetics are not used. Little can be done about this, I'm afraid, but I wonder if we would have better operators if everyone had a spell of SWLing before they obtained their licence, or if everyone had to undergo a short induction course on 'How to be an amateur' before they were allowed onto the Amateur Bands.

SWL reports... again

Richard G4ZFE was obviously prompted to write following the appearance in June *RadCom* of the QSL Competition write-up. He admits to still being an SWL at heart, and to having used SINPO reports when he was a 'proper' SWL because he felt it conveyed more information. Maybe, but it is very unusual not to use RS/RST.

His main point was that most of the SWL reports (from Eastern Europe) he has received have told him he was 59 or 599 (some even pre-printed!). I have said many times to be honest about your reporting. If a station is only 53 on your long wire, say so. An explanation about the poor antenna set-up could be given, but if the

report is useful, accurate and *HONEST*, you will more than likely get the desired card in return.

Charles, G4ZZG, also wrote about SWL reports. He had just received his first SWL report and it was useful too. Charles lives in Mansfield and had an SWL report from a listener on the Kent coast reporting on his 28MHz CW signals. This indicated that at the time there was either very extended ground wave coverage, or extremely short skip conditions.

More on antennas

Dave, G0INP, found his way to the column and was prompted to write a few comments, hints and prejudices about antennas. He too admits to still being an SWL first and is a great believer in twin feeder rather than coax to feed his antennas. 75 or 300ohm twin is cheaper, lighter and far more durable and a lot less conspicuous than coax.

As for an ATU, G0INP uses a Z-match which he finds works well on all bands from 28 through to 1.8MHz. If any SWL is interested in the design, Dave will happily provide the necessary details on receipt of an sae to 3 Elm Terrace, Mannamead, Plymouth.

Finally, an idea for anyone with limited space. Dave has no garden and he lives in a Conservation Area in the City of Plymouth. Owing to poor TV reception in the City, Plymouth is plagued with long poles to support TV antennas. This has been used to support a pair of antennas — a dipole for the LF Bands and a loop for the HF Bands. Although purely for receiving, the loop tunes 28-3.5MHz with respectable performance, and because of its height — at about 50 feet — it is very quiet. The loop has a circumference of about 46 feet with about 30 feet of 300ohm twin on the dipole. Experimenting with a dipole below the roof line proved poor by comparison, so the extra height to clear the house produced a huge improvement in performance and was well worth the effort in getting it 'skyborne'.

Finale

If you haven't already done so, turn to the front of the magazine to ready my 'Spectrum Analysis' offering which reports on good conditions on HF and exceptional Sporadic-E propagation on 50 and 144MHz.

News, comments, views, pen pictures and photographs for inclusion in the October issue should be with me no later than **Friday 18 August**.

Moving towards 1992

'Things European' have been very much on our minds recently. No doubt you took advantage of the European Parliamentary Elections to ascertain the views of your local MEP on the subject of EMC standardisation and the removal of trade barriers between member states...

Manufacturers in the electronics industry are now very much aware that standardisation of technical specifications is vital for the acceptance and continued competitiveness of their products after 1992. Many companies have not really considered the EMC aspects of their products in the past. Although costly, perhaps they should now be thinking EMC during the initial design stages.

After 1992 manufacturers will have to certify that their products do not cause EMI and that they are also sufficiently immune to such interference. EMI, by the way, is defined as degradation of the performance of a device, equipment or system caused by an electromagnetic disturbance. All products which comply with the standards laid down in the Directive will carry a C E mark.

Once the standard has been achieved periodic checks must be made to ensure that there is continued compliance. The Directive requires 80% of mass production to comply with 80% certainty. If there is any change in production methods or component parts which may alter the emission profile then retesting is required.

Test houses with NAMAS (National Measurement Accreditation Scheme) accreditation are set to do a roaring trade, as demand will outstrip supply. Some large companies such as Plessey Assessment Services and ERA Technology are expanding and companies who have in-house EMC test facilities are looking at the future with more commercial eyes.

EMC and the automotive industry

The micro-minialisation revolution in electronics has brought about many benefits in all walks of life, not the least in the automotive field. Vehicle manufacturers can now enhance their product specifications with all sorts of add-on goodies that would have previously required a

following trailer to package. It is not only the executive class and top-of-the-range models which carry a plethora of electronic modules, many basic models include engine management systems.

Herein lies the problem: the more electronics which is packaged into vehicles, the more susceptible these vehicles become to EMC problems, some of which could be safety related.

The 1992 EEC Directive on EMC is designed to address these problems and vehicle manufacturers throughout the EEC are currently working together to draw up a workable test standard.

Although the directive is not yet law, many vehicle manufacturers have for several years been subjecting their products to EMC testing to ensure that safety related systems are immune from the levels of interference likely to be experienced both internally and externally to the vehicle.

EMC testing in the automotive field is complicated, as the systems have to be tested in a controlled and repeatable way and obviously in an artificial environment. Japan and America have had EMC test facilities within their automotive industries for a long time. Britain is fast catching up and in some areas is on a par.

Seven years ago the MIRA (Motor Industry Research Association) EMC department was established with support from the DTI, the Department of Transport, the Metropolitan Police, along with seven other companies. MIRA now represents 200 motor industry members and is funded partly by subscriptions, but mainly by its income from research, development and testing contracts. Last year their EMC laboratory at Nuneaton was officially opened. Amongst other facilities it boasts a large anechoic steel chamber with walls and ceiling lined with energy-absorbing pyramids made of carbon impregnated polyurethane foam. In the floor is a set of vehicle driven rolls and a turntable which enables vehicles to be driven as if on a road and at the same time being subjected to electromagnetic radiation. The control room close by, fitted out with computer and manual controls combined with the equipment in the main chamber allows the EMC performance of most vehicles to be tested under repeatable and realistic conditions, over a frequency range of 10kHz to 1GHz, with field strengths of up to 200V/m at 1m distance.

It is reassuring to know that research is continuing in this area which affects all mobile operators at one time or another.

Pacemakers and EMI

The increased use of electronic devices in medicine and their susceptibility to EMI is another area in which much research is being carried out. Only recently a suitable patient was being sought for the first operation to implant a programmable device to give life-saving shocks to an ailing heart - a type of mini defibrillator.

Implanted pacemakers are now commonplace; they are rigorously tested, as the manufacturers realise that "demand type" pacemakers by their very nature are extra sensitive to EMI. In certain situations the pacemaker and its wiring, by acting within the body as a loop aerial, may pick up radiation from electromagnetic fields. This radiation may come from such sources as arc welding equipment or from RF on microwave security devices as in airports or large stores, electric ignition systems on vehicles and lawn mowers.

All pacemakers have interference sensing circuits which on being fed false signals, put the pacemaker into a "fixed rate" back-up mode until interference ceases. Normally there is no problem with them, but when the received interference is around the normal heart rate, eg 60 - 80Hz and is pulsed, the sensing circuit may be fooled into believing it is monitoring a cardiac signal and could inhibit the output.

When patients are fitted with a 'demand type' pacemaker they are advised not to do arc welding or stand too close to a high power electrical or magnetic transmitting source.

Further down the line

As mentioned in the last 'EMC Matters' BT have a consumer service department in your local area. If you are experiencing telephone interference contact the local customer services manager who will initiate the necessary investigations. There are however one or two potential traps concerning ownership of equipment and liability for charges.

If you hire your equipment from BT an engineer will call and there will be no charge. If you have bought your phone from a BT Phone shop and are having problems, return the phone to the shop and if it is under warranty it will (we believe) be replaced by a more immune model. If this is not possible an engineer could call. If the phone is out of warranty a charge will be made.

If you have bought your phone from another outlet the phone must be returned to the supplier. If subsequently an engineer has to be called there will be a charge made.

EMC helpline

The Society has installed an EMC Helpline at the EMC Committee Chairman's QTH to improve the service to society members who may have EMC problems.

The service is available 24 hours a day on 0329 239644.

If the Chairman is not available, please leave a message on the Answering machine and he will arrange for a return call as soon as possible.

For general correspondence, please mail to A M Dearlove, G1WZZ, 10 The Greendale, Fareham, Hampshire, PO15 6EP.

Cassette recorder interfacing and EMC

There is quite a lot of misunderstanding about hi-fi amp/cassette interfacing. Here are a few hints to help reduce break-through troubles which may arise with neighbours' equipment. There are two main differing types of audio connection between amplifiers and recorders - phono and DIN leads and plugs. In the phono interface, the source signal is normally low impedance, from a few tens of ohms to a maximum of a few thousand ohms. At the load end, the load impedance is rarely less than 20,000ohms, and frequently greater than 47,000ohms. These impedances cover both record and playback feeds. As the AC voltages are fairly high, any break-through is thus at a lower relative level.

With the DIN standard (regarded by many audio people as a menace) the source signal from the amplifier is a high impedance one, and the load in the recorder input circuit is often very low impedance. The problem is that in the DIN standard, the source signal should provide a current of about 1 microamp into the input of the recorder. Often the source impedance is as high as 470kohms. The source voltage might be typically 470mV but this is attenuated by the low input impedance of a DIN mic stage, acting against the high source of 470kohms.

Now you can see why you don't stand much chance with some of the old 'battle-axe' recorders using only DIN leads to the DIN standard!

Another reason for avoiding DIN interconnections is that long leads may give an appreciable high frequency loss if the load is at the maximum of 47kohms. If you see that the neighbour has left the mics plugged in, although the phono inputs are in use, you might find that break-through is reduced by

unplugging the mic leads. The problem is that these leads can bring RF into the chassis of the set. Some parts of the electronics are very sensitive to any disturbance, typically the replay head circuitry. Try and persuade the set's owner only to plug in the mics when they are needed. You might also try a ferrite ring on the mains lead as near to the recorder as possible. Be careful to avoid earth loops as these can cause more break-through problems. If the deck has just two wires for the mains, then don't add an earth, if the main installation itself is earthed. Two earths in the same system have a habit of bringing Radio Moscow into the system, or perhaps your signals!

Bits and pieces

The last few months have seen a lot of 'behind-the-scenes' activity by the Society in preparation for the implementation of the EC EMC Directive in 1992. An informal meeting was held in February in Dusseldorf, West Germany, to discuss the harmonisation of the various requirements of the Amateur Radio national bodies within the 12 community countries. Although only 10 of the countries sent delegates it was interesting to note that the total number of licensed Amateurs represented was in excess of 200,000, of whom 135,000 were members of National Societies. EMC is a high priority.

A further meeting of the EC group took place at Ham Radio Germany, in June - a report will appear in a future column.

The implementation of the EMC co-ordinators' scheme to provide local assistance to UK Amateurs is progressing. However, there is still a shortage of volunteers to assist in the South East - notably Kent, East Sussex and West Sussex. These are highly populated areas, so if you feel you could help in any way, please contact Alan Dearlove on 0329 239644. Once we have a full team, we can go into operation.

On a sad note, the EMC Committee Chairman, Dan Bernard, G4RLE has resigned. Alan Dearlove, G1WZZ, has taken over as Chairman and has instigated an EMC Helpline as a service to membership.

DEMC news flash

Tune in to the IARU Region 1 EMC net. Net controller - HB9 CVQ, Dr Dieter Hansen Dieter is a member of the Region 1 EMC Committee Net frequencies - 14.295 MHz/±5kHz at 18.00z in EU, 21.00z in USA, 3.605MHz/±5kHz at 20.00z. The net is held on the first and third Sundays of each month.



STEPHENS-JAMES LTD.

47 Warrington Road, Leigh, Lancs WN7 3EA. Telephone (0942) 676790

Turn at the Greyhound Motel on the A580 (East Lancs. Road).



LANCASHIRE & THE NORTH WEST'S LEADING RETAILER IN AMATEUR RADIO.

ANTENNA RANGE

Cushcraft	
A3 3 Element Tribander Beam.....	£262.00
A3 4 Element Tribander Beam.....	£353.35
10-3CD 3 Element 10m Monobander.....	£115.04
15-3CD 3 Element 15m Monobander.....	£139.70
20-3CD 3 Element 20m Monobander.....	£238.21
AP8 5 Band Vertical 25ft High.....	£164.35
AP5 5 Band Vertical 25ft High.....	£123.36
18 Element 2m Boomer Antenna.....	£106.59
15 Element 2m Boomer Antenna.....	£85.26
Ringo Ranger 2m antenna.....	£42.95

Butternut	
HF6VX 6 Band Vertical Antenna.....	£159.00
HF2V 80/40 meter Vertical.....	£142.00

All Butternut accessories available

Hy-Gain Antenna Range available
KLM range of antennas available

Jaybeam	
TB3MK3 3 Element Tribander.....	£348.85
TB2MK2 2 Element Tribander.....	£234.60
TR1MK3 Rotary Triband dipole.....	£117.30
VR3MK3 Triband Vertical.....	£81.65
DB4 4 & 5 Element Beam.....	£129.37
4Y6m 6m 4 Element Beam.....	£54.05
5 Element 2m Yagi.....	£20.53
8 Element 2m Yagi.....	£26.28

Antenna Tuning Units	
Kenwood AT230.....	£208.00
MFJ 962B 1.5 kW Versatuner.....	£241.00
MFJ 949C 300W Versatuner.....	£157.00
MFJ 300 Watt Basic ATU.....	£105.00
MFJ 1601 Random Wire Tuner.....	£42.00
Global AT1000 SWL Antenna Tuner.....	£69.00

Weiz	
D130N 25-1300 MHz Discone Antenna.....	£79.00
DCP5 5 band trappes vertical with radial kit.....	£195.00
DCP4 4 band vertical.....	£145.00

ALPHA range of linears now available	
Full size G5RV Antenna.....	£16.50
Half size G5RV Antenna.....	£14.50
Carriage/Postage at cost	

Kenwood Range

TS940s HF Transceiver.....	£1995.00
AT940 Automatic Antenna tuner.....	£244.88
SP940 Speaker with filters.....	£87.55
TS440S HF Transceiver.....	£1138.81
AT440 Automatic Antenna tuner.....	£144.82
PS50 20 amp power supply.....	£222.49
TS140S HF transceiver.....	£862.00
PS430 power supply.....	£173.78
AT250 Automatic Antenna tuning unit.....	£366.00
AT230 Antenna tuning Unit.....	£208.67
TL922HF Linear amplifier.....	£1495.00
MC50 Base station microphone.....	£46.00
MC60A De Luxe desk microphone.....	£88.22
TR751E 2m Multimode Mobile Transceiver.....	£599.00
TM2550E 45 watt 2m Transceiver.....	£465.00
TM221E 45 watt FM Transceiver.....	£317.00
TM421ES 70cm 35 watt Transceiver.....	£372.00
TS680S HF + 6m Transceiver.....	£995.00
TM721E FM Dual Bander.....	£699.00
TH25 2m FM Handheld Transceiver.....	£258.00
TH205E 2m FM Handheld Transceiver.....	£215.00
TH215E 2m Handheld FM Transceiver.....	£252.00
TH405E 70 cm Handheld FM Transceiver.....	£288.00
RS000 General coverage receiver.....	£875.00
VC20VHF Converter 108-174MHz.....	£167.21
R2000 General coverage receiver.....	£595.00
VC10VHF Converter 118-174MHz.....	£161.95
HSS De Luxe headphones.....	£37.54
LF30A Low Pass Filter.....	£34.00
TM231E 50 Watt FM 2M mobile.....	£289.00
TM431E 35 Watt FM 70cm mobile.....	£318.00
TM701E Dual Bander 25 Watt.....	£469.00
RZ1 Wide Band Scanner.....	£465.00

"TEN TEC"
We are pleased to announce we are the northern stockist for the full Ten Tec range
"PARAGON" Transceiver + General Coverage..... £1839.00
"CORSAIR" amateur band transceiver..... £1200.00
"ARGOSY" mobile transceiver..... £589.00
"CENTURY" CW only transceiver..... £399.00
Full range of accessories, Psu's - Filters - Microphones.

Receivers

AR2002 Scanning receiver covering 25-550MHz and 800-1300MHz.....	£487.00
R535 Aircraft Bands receiver covering 108-143 and 220-380MHz.....	£249.00
R537 Handheld Aircraft Band Receiver.....	£69.50

New model HF225 General Coverage Receiver

£395.00	
AR900 UK Scanner.....	£235.00
WIN108 Handheld Scanning Airband Receiver.....	£175.00
AOR 800E Hand Held Scanning FM-AM Receiver. 75-105MHz, 118-136MHz, 140-174MHz, 407-495MHz, 830-950MHz.....	£199.00

Datong Range

AD370 Outdoor Active Antenna.....	£77.62
AD270 Indoor Active Antenna.....	£58.22
D70 Morse Tutor.....	£63.40

MFJ Accessories Range

MFJ1701 6 way Antenna switch.....	£30.72
MFJ910 Mobile Matching Unit.....	£20.42
MFJ300 watt dummy load.....	£28.35
MFJRF Noise Bridge.....	£63.10
MFJ 815 2KW Cross needle SWR/Power meter.....	£57.32

Daiwa	
CS201 2 way Ant Switch.....	£14.00
CS4 4 way Ant Switch BNC Sockets.....	£30.39
NS660P 18-150MHz + PEP Meter.....	£115.00

Rotators	
GS400.....	£139.00
GS400C.....	£169.00
GS600C.....	£219.00
Daiwa MR 750E.....	£254.00
CDE AR40.....	£168.72

Power Supplies	
PS120M 3-15V variable 12AMP max.....	£79.50
PS30MX 30AMP PSJ.....	£129.50
Stockist for Heil microphones, Mirage amplifiers, Global Publications by RSGB and ARRL. Post/carriage charged at cost. Our secondhand list is updated daily. Please send SAE for this or any information. Shop Hours 9.30 to 5.00 pm Mon. Fri. 4.30 pm Sat	

PACKET RADIO

FROM THE SPECIALISTS!

Siskin Electronics have a policy of supplying the best range of packet radio equipment available for the radio enthusiast. We have examined the products of many manufacturers and are pleased to be able to offer what must be the widest range of equipment available from just one UK supplier. All prices include VAT and are valid at time of publication.

PACCOMM	
TINY 2 with PMS.....	£119.00
TNC-320 dual port NEW.....	£179.00
MICROPOWER-2.....	£149.00
PC320 HF/VHF PC card + PMS!.....	£189.00
Real Time clock option.....	£27.95
9600 baud adaptor.....	£95.00

AEA	
PK88 Budget TNC.....	£POA
PK232 best selling multimode.....	£POA

KANTRONICS	
KPC2 HF/VHF with Wefax.....	£POA
KPC4 HF/VHF dual port.....	£POA
KAM all mode with Wefax.....	£POA
"Smartsocket" battery backup.....	£17.95
"Smartwatch" real time clock.....	£27.95

UPDATES	
PACCOMM PMS (fits TNC-200/220, MFJ 1270/74, G0BSX and AEA PK88).....	£12.50
KAM/KPC4 2.85 UK.....	£15.00
KPC2/KPC4 2.85 UK.....	£10.00
AEA PK88 (16th May 1989 UK).....	£10.00
AEA PK232 (30th Dec 1988 UK).....	£15.00

NOTE: All our units have CW Ident to comply with UK regulations.
Plus full range of NAVICO accessories, audio and computer connectors, and industrial packet radio products. Phone for catalogue and price list.

IMPORTANT:

As of July 1st 1989 the new address and details of Siskin Electronics will be:
SISKIN ELECTRONICS LTD
2 South Street,
Hythe, Southampton SO4 6EB.



Tel: 0703 207155
Fax: 0703-847754

BANDEGE ANTENNAS

Vertical H.F. ANTENNAS for 10-15-20 designed and manufactured in the U.K. D.X. TRISTAR. A new approach to the TRI-BAND vertical ground plane using two trapped tubular self supporting radials, pole, roof or chimney mounting, exceptional performance with a very low V.S.W.R., no adjustments required. Superb mechanical construction, stainless steel and galvanised fittings, waxoil corrosion prevention. Price £94.00.

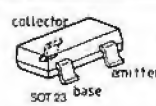
WBV-1 TRI-BAND vertical with wire radial kit. Price £70.00. Prices include VAT, post packing and insurance. Please send for details to:

Myandering Ltd, Barnwell House, Barnwell Drive, Cambridge CB5 8UJ. Tel: 0223 410699.



BLUE ROSE ELECTRONICS

SMD's
SURFACE MOUNT DEVICES



Full range SMD R's, C's, Transistors and IC's
SMD 'Starter Kit' a 0.5W AF Amp for QRP Rx, OP. £6.80.
SMD Assembly Jig £16.50. A 15 page catalogue £1.00 from:
BRE, 538, Liverpool Rd, Great Sankey, Warrington WA5 3LU.
Mail Order. Callers by app. Tel: 0925 72 7848

VALVES

VALVES

VALVES

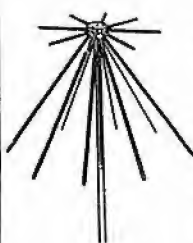
The following valves in matched pairs 6JS6/C, 6KD6, 6JB6/A, 6LQ6, 6HF5, 6146A, 6146B. YES the 6JS6/C is Japanese and works in the FT101. Most amateur radio valves including difficult to obtain types EX STOCK. Quotations without obligation. If we don't stock your type we may be able to import for you, PLEASE ENQUIRE, REMEMBER over 200 types EX STOCK. See for list. Phone for assistance re types suitable for your equipment. USA and Jap manufacture of popular types available.

DON'T DELAY 'PHONE TODAY 045 75 6114, G4AZM
Wilson, Peel Cottage, Lees Road, Mossley, Tameside, Manchester

REVCO

WHEN QUALITY COUNTS

REVCONC



The UK's favourite discone composed of traditional British quality engineering.
The REVCONC works well without exaggerated advertising claims. It is designed to cover 50 to 500MHz, and thousands of satisfied users will testify to its efficiency. Unlike some manufacturers we do not claim a wider frequency coverage, and we do not quote inflated figures for gain. A gain figure is meaningless unless the reference point is stated.
Optional vertical whip feature: It is possible to fit a vertical whip section to a discone. We do not want to give you the "hard sell" where this vertical element is concerned but there is some evidence that it may improve the performance of the antenna around the resonant frequency of the whip. That's why we make it an optional feature.
Another option is the N-type connector instead of the popular SO239. N-types give a better UHF performance, but they cost a bit more. The choice is yours.
Because the REVCONC is British-made by a Company which has been in business for 30 years, you buy with confidence knowing that there is back-up should anything go wrong.

RADAC

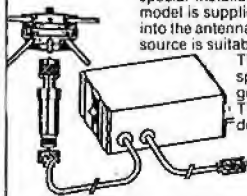


This Wide-band antenna offers an interesting alternative to the discone. It is simply an array of dipoles, but the clever bit involves arranging the dipoles to maximise bandwidth and minimise interaction. The RADAC can be set up for a range of frequencies from 27MHz to 500 MHz, and because very good impedance matches can be obtained the user can specify any six frequency bands in this range for optimised performance, either for receiving, or more usefully, for transmitting. For example, all the Amateur Bands from 10M to 70CM can be covered in one antenna. If you are in the PMR business, the RADAC can be customised for your needs. Aircraft listening enthusiasts can specify VHF & UHF Airband coverage. What a versatile antenna! Design and engineering excellence from REVCO!

WIDE-BAND PRE-AMPLIFIERS

The problem with omni-directional wide-band antennas is their lack of gain. The REVCO PA3 range of wide-band pre-amplifiers complement the antennas and compensate for their shortcomings.

The basic specification of the products is similar: coverage 20MHz-1GHz, at 1GHz: minimum gain 13dB, noise factor 5.5dB. Choose from a mast-head version (PA3) or a standard die-cast box style (PA3i). Best results are normally obtained from the masthead model which gives a boost to weak signals which would otherwise have been lost in the feeder cable. Also feeder cable noise is not amplified which is the case if the amplifier is mounted at the base of the feeder. On the other hand, the die-cast box version requires no special installation and is readily taken out of circuit. The masthead model is supplied with a special power unit which feeds the DC supply into the antenna feeder. No PSU is provided for the PA3i, as any 9-15V DC source is suitable (current requirement about 25mA).



The PA3i finds application in instrument work, e.g. input to spectrum analysers, boosting the output from signal generators to give a low-power Tx.

The standard version of the PA3i has BNC sockets and is designated "PA3i/B"; available to special order N-type sockets ("PA3i/N") or SO239 ("PA3i/S").

A special feature of the PA3 series is a high-pass filter to attenuate frequencies below 20MHz; high-power HF & MF broadcast stations can be very troublesome!

ON-GLASS ANTENNAS

This type of antenna mount has been around for a long time, but they are very difficult to produce successfully at VHF. The Cellular Radio Industry has popularised the glass-mount, but there are fewer problems at 900MHz, because the coupling assemblies are small. REVCO's extensive experience in making the UK's best Cellular On-glass has led to the production of superior quality VHF and UHF models. Here are a few facts which you should know:

Coupling efficiency: apart from the question of effective power transfer to the outside world, you don't want too much RF floating around inside the car, do you? Not healthy for vehicle electronic systems, and possibly not good for humans either. REVCO glass mounts feature very efficient power transfer.

Sticking power: no good if they fall off half way home. A properly installed REVCO stays on. Should you change your car, a refit kit is available.

Simplicity: some of the competition has a multitude of loose components: the REVCO has 2 pre-assembled parts: inside and outside. What could be simpler?

Weather-resistant: REVCO antennas are made from corrosion resistant materials so you can leave them out in the rain with confidence. It is not necessary to plaster the product with silicone rubber to keep the water out.

The REVCO glass mounts do cost a bit more, which reflects these superior features.

REVCO also make a full range of mobile antennas for frequencies from 27MHz to 950MHz, and new products are constantly under development. Contact your local Dealer or in case of difficulty write, phone or fax. Trade enquiries welcome.

Revco Electronics Ltd, Old Station Yard, South Brent, S Devon TQ10 9AL Tel: 0364 73394 Fax: 0364 72007

Photo

Acoustics Ltd.

Telephone

0908 610625

Fax

0908 568499

**MAIL ORDER
IS OUR
SPECIALITY**

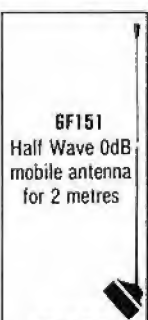
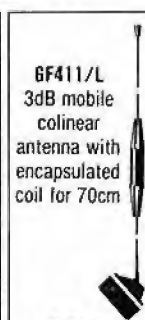
58 High Street, Newport Pagnell, Bucks MK16 8AQ

21st BIRTHDAY SPECIAL OFFERS

PHOTO ACOUSTICS LTD announce a NEW RANGE OF ON GLASS ANTENNAS FOR 2 METRES AND 70cm

- ★ Quick and easy to install
- ★ Simple SWR tuning by means of tuning screw on matching unit
- ★ Easy removable whip for car wash
- ★ Swivel joint for 180° angle adjustment
- ★ If removal of the antenna installation is necessary, a quick dismantling procedure leaves no trace of the installation
- ★ Ideal for the radio amateur who cannot fix anything to the 'company car'

The two New Models are as follows:-

	
6F151 Half Wave 0dB mobile antenna for 2 metres	6F411/L 3dB mobile colinear antenna with encapsulated coil for 70cm
PRICE £27.99 p+p £4.00	PRICE £28.99 p+p £4.00

****Please Note: Maximum power handling of these antennas is 25 watts.**

ICOM IC-32E DUAL BAND FM TRANSCEIVER



- ★ Two bands in one radio
- ★ Full Duplex capability
- ★ High output power.
5.5W on 2m and 5W on 70 cm
- ★ 20 memory channels
- ★ Programmed scan and memory scan

BIRTHDAY SPECIAL £389.00
(Carriage Free)

ICOM IC-3210E DUAL BAND MOBILE



- ★ Two bands in one radio
- ★ Full Duplex capability
- ★ High output power.
25W on 2m and 70cm
- ★ 40 memory channels
- ★ Programmed scan and memory scan

BIRTHDAY SPECIAL £479.00
(Carriage Free)

ALL THE ABOVE OFFERS ARE SUBJECT TO AVAILABILITY

SPEND UP TO £1,200 INSTANTLY WITH A PHOTO ACOUSTICS LTD. CREDITCHARGE CARD — APPLY FOR DETAILS

PART EXCHANGE WELCOME, ASK FOR KERRY G6IZF OR ANDY G4YOW

RETAIL SHOWROOM OPEN MONDAY-FRIDAY 9.30-5.30, SATURDAY 9.30-4.30



Goods normally despatched within 24 hours. Please allow 7 banking days for cheque clearance. Prices correct at time of going to press — E&OE

AZDEN PCS 6000 2M FM RIG

+ "Free Scanning Receiver"

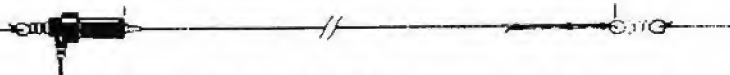


£329

The Azden PCS 6000 crept on the scene with very little announcement. Those in the "know" immediately realised its potential and snapped the first shipment up. By the time you read this we hope to have bulk supplies. So what is all the fuss about?

The basic transceiver is the same as the competition; 25 Watts of rf output, 144-146MHz, 20 memories, auto tone-burst, excellent receiver sensitivity etc. On the face of it nothing to get excited about! But that's only the beginning, the next part is really exciting. The receiver coverage has been extended from 108 to 179MHz. Yes it covers the aircraft band with a built-in AM detector for reception up to 136MHz and a properly designed front end with AGC and 5kHz steps for offset-VOLMET transmissions. Above this range, reception is FM. The transmitter side has a programmable "tone" module which is also used to programme the tone-burst of 1750Hz. The shift frequency is also programmable and is made to error-out on transmit beyond the range 144-146MHz. However, this can be used in conjunction with the reverse repeater switch to instantly monitor duplex transmissions throughout the entire receiver range. What is particularly attractive is the ability to programme into each memory, a unique shift and if appropriate, a unique tone. This makes the rig somewhat unique when looked at in conjunction with the frequency range. Finally the price: most rigs are well in excess of £350 these days, without all the above listed features. So for £329, we think you will agree that this has to be a very special deal indeed.

NEW SAGANT HF ANTENNA!



The famous end fed Zepp is back! These are single banders for 80; 40 or 20M (As used by GB5BN on summit of Ben Nevis). Directly end fed with 50 Ohm cable, they are a half wavelength long. Dipole radiation pattern, no hanging centre fed coax, extremely efficient and ideal for base or portable operation. Send for details.

- ★ 2M FM 144-146MHz
- ★ RX 140-170MHz!
- ★ 3 Watts output
- ★ Battery Saver
- ★ 10 memories
- ★ LCD Readout
- ★ S-meter
- ★ Tone Burst
- ★ Priority
- ★ 12.5KHz steps
- ★ 12v DC operation!

Another winner from ALINCO. A true handy transceiver with no extras to buy! Unlike its competitors, you get the nicad pack (500mAh) AC charger, and provisions for direct 12v DC charge. Measuring 168 x 61 x 30mm it's a beauty! Optional accessories include speaker-mic, mobile bracket and high power packs. Get the facts today!

ALINCO
DT-100E 2M FM

IN STOCK



£219

ALINCO ALD-24E

25 watts
Full duplex



£449

- ★ 2m/70cm. Full duplex operation.
- ★ 25 watts FM on both bands.
- ★ Single antenna socket output.
- ★ 21 memories & 2 "call channels".
- ★ Programmable scanning and priority.
- ★ 12.5KHz & 25KHz steps.
- ★ Includes all hardware & microphone.
- ★ Bright LCD readout.
- ★ Reverse repeater operation.
- ★ 12 months warranty parts & labour.

FREE CATALOGUE & PRICE LIST! We now have an illustrated catalogue of some interesting products for the radio amateur that we have never had the space to advertise. Also details of new items coming along. Just drop us a first class stamp and we will send you this plus our price list of over 700 items!

QRP OPERATORS!

SSB/CW Transceivers 189!

We now have in stock the Mizuho single band rigs for 80; 40; and 20 metres. Each is a complete SSB/CW station with 2 Watts output and is no larger than a 2 metre handheld. Can be powered from internal batteries or external DC, they are fully pocket hf transceivers. Built-in microphone, speaker and Morse key, plus IRT, noise blanker and VFO frequency control. Each one is supplied with one band segment fitted. Recent success stories include GB5BN who worked 40 stations in just over 2 hours from the top of snow covered Ben Nevis on 40m SSB using internal batteries. (Club secretaries please ask for details regarding free loan of 1 hour video of expedition.) Send for details of these transceivers.

NEW! SHORT WAVE LISTENERS "CONFIDENTIAL" FREQUENCY LIST. Now replaces old edition of "UKCFL" Fully up-dated it is probably the most comprehensive guide available. £7.95 post

DIAMOND AERIALS etc.

X50 2m/70cm 4.5/7.2dB	£59.00
X500 2m/70cm 8/12dB	£129.00
D130N Discona 26-1300MHz	£82.00
CLP5130 1.50-1300MHz beam 12dB	£179.00
CLP5130-2 105-1300MHz beam 13dB	£89.00
CP22J 2m 6.5dB base antenna	£49.95
M265 2m Mobile 5/6th PL259	£14.95
EL770H 2m/70cm Mobile PL259	£30.00
NR72M 70cm mobile 5.5dB PL259	£27.00
GLS Gutter mount/cable for mobiles	£14.95
D24N Duplexer 2m/70cms	£26.95
CP4 40-10m vert + radials	£149.00
CP5 80-10m vert + radials	£189.00

VSWR METSetc (New Design)

SX100 1.6-60MHz 3KW	£65.00
SX200 1.8-200MHz 5/20/200w	£65.00
SX400 140-525MHz 5/20/200w	£79.00

SX600 1.6-525MHz 5/20/200w	£119.00
MS1 Monitor Scope Pep etc	£269.00

MISC

ADONIS AM303G Base mic	£49.95
ADONIS AM503G Base mic	£65.95
ADONIS FX-1 Mobile Goose Neck	£55.00
2m 5/8th BNC telescopic ant	£12.95
LF 80/40 70ft dipole kits	£29.00
'Limpet' Rubber mag base. It won't move!	£19.00
VHF/UHF Airband Guide 2nd Ed	£5.95
UK Confidential Frequency List	£6.95
Secret of Learning Morse Code	£4.95
Complete Guide to VHF/UHF Frequencies	£5.95
Pocket Guide to RTTY & FAX Frequencies	£2.95
Oceanic Airband Communications	£3.50
PLUS HUGE STOCKS OF KENWOOD; YAESU; ICOM; DATONG; JAYBEAM; TONNA; etc. If it is in this magazine we have probably got it!	

WATERS & STANTON

RETAIL & MAIL ORDER:- 18-20, Main Road, Hockley, Essex SS5 4QS.

Tel: (0702) 206835, 204965

RETAIL ONLY:- 12, North Street, Hornchurch, Essex RM11 1QX.

Tel: (04024) 44765

Visa and Access by telephone. 24hr. Answerphone.

CONTEST NEWS

RULES

YL/OM SUMMER SSB SPRINT

1800 - 2200 5 August

All HF bands (except WARC). Exchange RS, name, and state/province/country. Ladies only QSO men and vice-versa. Copies of rules from G3FKM.

SEANET 89 CONTEST

0000 19 August to 2400 20 August

Phone section. Single and multi-band single-operator and multiband multi-operator. Work stations within the SEANET area only. QSOs with DU, HS, YB, 9M2, 9M6, 9M8, 9V1 and V85 count 20 points on 1.8MHz, 10 on 3.5 and 7MHz and four on 14, 21, and 28MHz. With other SEANET areas the points are 10, 5, and two respectively. The multiplier is three for each SEANET country worked (these are A4, A5, A6, A9, AP, BV, XX9, C2, DU, EP, HL, HS, H4, JA, JD1, JY, KC6, KH2, KH6, P2, S7, VK, VQ9, V85, VS6, VS9K, VU, XU, XV, XW, YB, YJ, ZK, ZL, 3B6, 3B7, 3D, 4S7, 4X, 5W, 5Z, 8Q, 9K, 9M2, 9M6, 9M8, 9N1 and 9V1). The rules do not say but it is assumed that each multiplier counts once only. Send RS and serial number beginning with 001. Stations may be worked once per band and contest numbers should begin from 001 on each band. Submit entries to reach PO Box 2728 Singapore 9047 no later than 31 October 1989. G3FKM

RSGB SSB FIELD DAY 1989 RULES

In the July issue of *RadCom*, p77 left-hand column, the full address for logs was omitted from the rules. This section should have read as follows:

15. Address for logs: RSGB HF Contest Committee, PO Box 73, Lichfield, Staffs, WS13 6UJ.

HF-DF Contents

RSGB Qualifying Event - DARTFORD HEATH - Sunday 20th AUGUST 1989. MAP: O.S. Sheet No. 188 Maidstone.

Assembly: 1300 BST for 1320 BST start. LOCATION: Shipbourne, NGR 935323. Competitors requiring teas should notify Colin Merry. (G4CDM) Tel: (Day) 0322-95280 (Evening) 0322-523729 by 13th August.

RSGB Qualifying Event - CHELMSFORD & COLCHESTER - Sunday 10th September 1989.

MAP: O.S. Sheet No. 155. Bury-St-Edmonds. Assembly: 1300 BST for 1320 BST start. LOCATION: Long Melford Green, NGR 866467. Competitors requiring teas should notify Ian Butson. Tel: 0206 860724 by 3rd September 1989.

HOWDY DAYS

1400 6 September to 0200 8 September Open to YL operators only. Rules from G3FKM.

21/28MHz PHONE CONTEST RULES TRANSMITTING SECTION

1. Date and Times: Sunday 8 October 1989.

0700-1900 GMT (UTC).

2. Eligible entrants:

- (a) British Isles - RSGB members only.
- (b) Overseas (including EI) - All licenced amateurs.

3. Frequencies: 21150-21350kHz and 28450-29000kHz only.

4. Mode: Telephone only.

5. Sections:

- (i) British Isles Single-operator.
- (ii) British Isles Multi-operator.
- (iii) Overseas Single-operator.
- (iv) Overseas Multi-operator.

Single-operator entrants are those who receive no help of any kind during the contest. The use of spotting nets, and similar prefix assistance is strictly forbidden.

6. QSY (10 minute) Rule: An entrant who QSY's from one band to another and makes a scoring contact may not change bands again until at least 10 minutes have elapsed since the last scoring contact on the original band.

7. Exchange: RS report and serial number (commencing with 001) (UK stations contact any station outside of the British Isles. Overseas stations contact British Isles stations only (list below)).

8. Scoring:

- (i) QSO Points - 3 points for each completed contact on either band. (The same stations may be contacted on both bands for QSO points and Multipliers).

(ii) Multipliers -

(a) UK entrants: Each DXCC Country, additionally each Japanese, VO/VE, VK, ZL and USA call areas (irrespective of prefix) will count as separate multipliers. (Contacts with other British Isles stations do not count for QSO points or multipliers).

(b) Overseas entrants:

Each UK prefix will count as a separate multiplier. G0, G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD8, G10, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48, G49, G50, G51, G52, G53, G54, G55, G56, G58, G59, G60, G61, G62, G63, G64, G65, G66, G68, G69, G70, G71, G72, G73, G74, G75, G76, G78, G79, G80, G81, G82, G83, G84, G85, G86, G88, G89, G90, G91, G92, G93, G94, G95, G96, G98, G99, G00, G01, G02, G03, G04, G05, G08, G09, G10, G11, G12, G13, G14, G15, G16, G18, G19, G22, G23, G24, G25, G26, G28, G29, G30, G31, G32, G33, G34, G35, G36, G38, G39, G40, G41, G42, G43, G44, G45, G46, G48

CONTEST NEWS

up a table on the back of the HFC2 showing dates, modes and scores and then just mark the scoring sessions and total them. Both modes for one evening can go on the same log sheet without a gap, please always put the first contact on the first line, put the date somewhere else!

9. Entries: Must be postmarked not later than Monday 27 November and sent to the HF Contests Committee, c/o J Kennedy G3MCX, 22 Croham Park Avenue, South Croydon, CR2 7HH.

10. Data protection Act: Entrants should note that the Contest Adjudicator may enter the information from their logs into a micro-computer for the sole purpose of checking for duplicate contacts and preparing tabulations. If any entrant objects to this they must clearly state their objection on the cover sheet.

11. Awards: Certificates of merit will be awarded to the Entrants with the highest checked scores in each of the three categories in (7). Further certificates may be awarded at the discretion of the HFCC if the entry for any category exceeds 20.

12. Note: If the CW CQ is too fast send QRS de 'own call' or QRS IML, the other Op will slow down to any speed, you may be worth 13 points!

AUSTRALIAN LADIES' AMATEUR RADIO ASSOCIATION CONTEST RULES

Eligibility: All licensed operators throughout the world are invited to participate. Also open to SWLs.

Object: Participation: YL works everyone, OM works YLs only. One contest (combined phone and CW) run over 24 hours.

Starts: Saturday 11 November 1989 at 0001 hours UTC.

Ends: Saturday 11 November 1989 at 2359 hours UTC.

Suggested Frequencies: Bands to be used are 3-5, 7, 14, 21, and 28MHz only. The following are suggested frequencies for easier location of contacts: 28-100 to 28-350; 28-500 to 28-600; 21-100 to 21-200; 21-350 to 21-370; 14-060 to 14-235; 7-100 to 7-120; 3-525 to 3-590.

Operation: Phone and CW operation. Each station may be counted twice on each band from 3-5 — once on phone and once on CW. All contacts must be made in accordance with operator and station licence regulations. No net or list operation, no crossmode.

Procedure: Phone: Call "CQ ALARA CONTEST". CW: YLs call "CQ TEST ALARA" OM's call "CQ YL".

Exchanges: ALARA member: RS or RST, serial no starting at 001, ALARA member, name, YL non-member: RS or RST, serial no starting at 001, or OM name.

Scoring: Phone: 5 points for ALARA member contacted; 4 points for YL non-member contacted; 3 points for OM contacted.

CW: Double all points for CW contacts. SWL: 5 points for ALARA member logged; 4 points for YL non-member logged.

Logs: Single log entry (but Australian YL novices entering for the Mrs Florence McKenzie CW trophy should indicate their CW score separately also). Logs must show date/time UTC, band, mode, callsign worked, report and serial no sent, report and serial no received, name of operator of station worked, and points claimed.

Logs must be signed: Logs also to show full name, callsign and address of operator, and show final score (points claimed). Logs must be legible. No carbon copies. No logs will be returned. Decision of the Contest Manager will be final. Logs must be received

by the Contest Manager by: 31 December, 1989.

Contest Manager: Mrs Marilyn Syme VK3DMS, PO Box 91, Irymple, 3498, Vic, Australia.

Mrs Florence McKenzie CW Trophy: This will be awarded to the Australian YL novice operator with the highest CW score (not necessarily an ALARA member). Minimum score 50 points. The actual trophy, because of the size and weight, will not be forwarded to the winner, but a certificate bearing a photo depicting the trophy will be sent to the winner each year.

Certificates: will be awarded for the following:

- Top score overall
- Top score phone only
- Top score Australian YL novice CW (Mrs F McKenzie cert)
- Top score ALARA member in each country and VK call area
- Top score YL non-member in each continent
- Top score OM in each continent
- Top score SWL in each continent
- Top score VK novice
- Top score overseas YL novice CW.

Mrs Florence Violet McKenzie, 1892-1982, was the first woman in Australia to take out a transmitting licence, in 1921. She passed the Amateur Operator's Certificate of Proficiency in 1925 and obtained the callsign 2GA (later VK2FV). Mrs Mac taught morse code to thousands of people, particularly service personnel during the 1939-45 war years. In 1984 the Townsville Amateur Radio Club kindly donated a trophy in her memory.

DYLC MID-WINTER-CONTEST 1990

The rules are as follows:

Date: Saturday 13 January from 0700-1900 GMT CW; Sunday 14 January from 0700-1900 GMT SSB.

Bands: All bands from 3.5 to 29.7MHz (no crossbands). Please work according to the band plan recommended by the IARU for Region 1.

Procedure: YL's call CQ Contest or CQ Mid-winter Contest; OM's call CQ YL's. YL's work with YL's and OM's; OM's work YL's only.

Exchange: Call, RS(T) + number, country, OM's start with 001, YL's with 2001. Time, band, date, YL or OM must be noted in the logbook.

Points: Every QSO with a YL = 5 points; every QSO with an OM = 3 points; One station per band may be worked.

Multipplier: Every DXCC-country counts as multiplier (not per band).

Total Score: Points for all bands x multiplier.

SML's: YL-station every heard counts for 5 points. Multiplier as above.

Logs must show call of the station being worked. Logs must be sent to:

DYLC
PO Box 262
3770 AG Barneveld, Netherlands
Before 18 February 1990 (date of post mark).

7MHz CW CONTEST 1990

1. Date and Time: 12000 GMT 24 February 1990 to 0900 GMT 25 February 1990.

2. Sections: Single Operator entries only. British Isles entrants must be members of the RSGB.

Seven sections:-
(a) British Isles (b) Europe (c) North America (d) South America (e) Africa (f) Asia (g)

Oceania.

3. Frequencies: 7.000-7.030MHz.

4. Exchange: RST plus serial numbers starting at 001.

5. Scoring:

- (a) British Isles. Five points for each completed contact within Europe. Fifteen points for contacts in sections (c), (d), (e) & (f). Thirty points for sections (g). British Isles stations may not work each other.
- (b) Europe. Five points for each completed contact with a British Isle station.
- (c) North America. Fifteen points for each completed contact with a British Isle station.
- (d) South America. Points as section (c).
- (e) Africa. Points as section (c).
- (f) Asia. Points as section (c).
- (g) Oceania. Thirty points for each completed contact with a British Isle station.

6.1 Multipliers:

Section (a). One for each ARRL DXCC Country, in addition W1, W2, W3, W4, W5, W6, W7, W8, W9, W0 and VE, VK, and ZL call areas will count as a separate Country. Sections (b), (c), (d), (e), (f) & (g). One for each different British Isle prefix worked.

6.2 Final Score:

Total contact points multiplied by total of multipliers.

7. Documentation:

Logs to be headed: GMT, Callsign, RST number sent, RST number received, Multiplier Points.

Duplicate QSO's: Must be clearly marked. Logs containing unmarked duplicates for which points have been claimed may result in disqualification. Please include a summary sheet of multipliers worked and a copy of your dupe sheet.

Cover Sheet: Each entry must have a cover sheet giving details of the computed score together with the following signed declaration: 'I agree that the decision of the Council of the RSGB shall be final in all cases of dispute'.

8. Awards: The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the Transmitting section. Certificates of Merit will be awarded to entrants placed first, second and third providing that a minimum of ten logs are received for each section. For less than ten logs then a Certificate will only be awarded to the leading station in that section.

9. Name and Address for Entries: John Bazley G3HCT, HF Contests Committee, Brooklands, Ullenhall, Nr Henley in Arden, Warks B95 5NW, England. UK logs must be received by 26 March 1990. Other logs by 23 April 1990.

10. Data Protection Act: Entrants should note that the Contest adjudicator may enter information from their logs into a micro-computer for the sole purpose of checking for duplicate contacts and preparing tabulations. If any entrant objects to this they must clearly state their objection on the cover sheet.

11. Receiving Section: (a) Rules 1, 2, 3, 5, 6.1, 6.2, 7, 8, 9 & 10 will apply.

(b) Holders of Class B licences may enter this section.

11.1 Scoring:

(a) British Isles listeners should only log overseas stations in contact with British Isles stations. For European stations logged Five points all others Fifteen points.

(b) Overseas listeners should only log British Isles stations participating in the contest. European listeners claim Five points — all others except those in Oceania claim Fifteen points — Listeners in Oceania claim Thirty points.

Note: The 'G' callsign may only appear once in every three contacts logged except

when the logged station is a new multiplier for the receiving station.

12 HF Contest Championship

Participation in this Contest by British Isles stations will count towards the RSGB HF Contest Championship for 1990/91.

RESULTS

BERMUDA CONTEST 1989

Results of the 1989 Bermuda Contest have arrived. The UK winner is G4OSY who scored 198,205 points. The other UK entrants were: G4SZD (146,160), G4CNY (23,925), G0HSD (10,285), G3KNU (8,000), and G10KOW (6,885). Each is in a different county so wins an area award. The USA winner was N2NT who scored 236,000 points. DK8FD won the W.German part of the competition with a magnificent 414,000 points. VE3XN (100,160) was top Canadian, and VP9LR (1,058,750) Bermuda winner. The winners will be presented with their trophies at the Radio Society of Bermuda's dinner on 20 October. Next year the Bermuda Contest will take place during the weekend of 17 and 18 March. G3FKM

RSGB, HF-DF QUALIFYING EVENT — BANBURY

14 May 1989

Eighteen teams assembled at Drayton School, Banbury on a warm Sunday afternoon, to take part in Banbury's first national direction finding hunt.

Very strong signals were received at the start, causing more than one team to remain close to Banbury until beyond 2 pm.

Station 'A' G3TRY/P, operated by G4DLB and C4OCO, was located 14km North East of the start. The long walk, coupled with the presence of a more likely site in the area, caused most teams to wait for a further bearing on the site before setting off on foot.

The transmitter was located two hundred feet from the bank of a deep, wide waterfilled drainage ditch, in a hawthorn hedge, bordering a small pine wood. The aerial ran three hundred feet along both banks of the ditch, thus causing concern to teams, regardless of which direction they had entered the site. Only two teams visited the site first, most preferring the selection of wooded areas to be found along the bearing to the 'B' station.

Station 'B' G4MDF/P, operated by G0LDE and son was located 13.5km South West of the start, in a deep wooded valley. The transmitter was hidden within a very large thorn bush on the banks of a stream. Access to the transmitter was impossible from the direction competitors had chosen. So all had to pick their way through a swamp, jump a stream and enter from the rear.

Four hundred feet of wire was stretched across the valley a considerable distance from the transmitter. It was "Teed" off to the valley floor, then zigzagged across the valley floor, back to the transmitter. This ensured teams spent a long time trekking through the rather unpleasant undergrowth. The site was chosen in the hope that many teams would begin hunting in a large wood just to the South West of the site. In the event every team member spoken to, admitted doing just that.

Fifty one people attended an excellent tea afterwards at Hardwick Community Centre in Banbury. George Whenman was

presented with the Banbury Amateur Radio Society Shield for first place and Alan Simmons presented with the runners up

prize. Out of 18 teams that started, 17 found both transmitters and one team (a Banbury club member) could only find one.

BANBURY DIRECTION FINDING EVENT RESULTS

	Name	Club	'A' Station	'B' Station
1	George Whenham	Coventry	1534	1432
2	Alan Simmons	Mid Thames	1548	1427
3	Min Standen	Mid Thames	1549	1435
4	Andy Collett	Chelmsford	1440	1552
5	Chris Wells	S Manchester	1552-08	1439
6	Dave Holland	S Manchester	1552-75	1428
7	Brian Bristow	Mid Thames	1554-00	1430
8	Peter Lisle	Mid Thames	1555-98	1450-40
9	Chris Plummer	Mid Thames	1555-45	1427
10	Geoff Foster	Stratford	1555-46	1433
11	Khee Chan	S Manchester	1555-47	1424
12	Bill Pechey	Mid Thames	1602	1437
13	Graham Taylor	Ariel R.G.	1604-00	1425
14	Derek Newman	Northampton	1607-00	1438
15	Colin Metcalfe	Mid Thames	1614-00	1437-30
16	Trevor Gage	Mid Thames	1615	1423
17	Ian Butson	Colchester	1451	1629-30
18	Gordon Reason	Banbury	1556	—

Alan Simmons and Min Standen qualify for the 1989 National Final.

A) BEST THREE FROM FIVE — CW

Posn.	Callsign	County	10/4	18/4	26/4	4/5	12/5	Checked score
1	G0CPE	SRV	170	203	CK	200	CK	573
2	G4WVX	BKS	155	164	CK	196	CK	515
3	G3JUZ	LDN	161	—	151	158	CK	470
4	G3BFP	LDN	160	CK	151	158	—	469
5	G3GLL	ESX	152	CK	151	160	CK	463
6	G3MCX	LDN	CK	118	122	158	CK	398
7	G4AGQ/M	SWX	CK	112	122	132	CK	366
8	G0BON	BRK	CK	128	117	119	—	364
9	G6NKK	SRV	82	76	94	CK	CK	252
10	G4ARI	LEC	123	110	—	—	13	246
11	G2HLU	DOR	81	CK	52	110	CK	243
12	G0AHI	KNT	53	90	—	—	55	198
13	GM4GRC	FFE	65	—	—	39	26	130

B) BEST THREE FROM FIVE — SSB

Posn.	Callsign	County	10/4	18/4	26/4	4/5	12/5	Checked score
1	G4WEY	DOR	266	266	CK	299	CK	761
2	G0CEI	OFE	244	242	CK	253	—	739
3	G0CPE	SRV	270	CK	CK	254	157	681
4	G4MET	HWR	120	226	116	—	CK	462
5	G3JUZ	LDN	141	—	109	191	CK	441
6	G4AGQ/M	SWX	132	CK	CK	116	112	360
7	G3MCX	LDN	135	103	CK	120	CK	358
8	G3ZMS	SWX	103	115	—	126	CK	344
9	G2HLU	DOR	CK	CK	52	117	52	221
10	G0AHI	KNT	74	74	—	CK	32	180
11	G4ARI	LEC	110	45	—	—	—	155
12	GM4GRC	FFE	13	52	—	78	—	143
13	G3BFP	LDN	—	16	—	—	—	16

B) BEST THREE FROM FIVE — EVENINGS (CW AND SSB)

Posn.	Callsign	County	10/4	18/4	26/4	4/5	12/5	Checked score
1	G4RCG	YSW	CK	597	373	536	CK	1506
2	G0CPE	SRV	440	402	CK	454	CK	1296
3	G3JUZ	LDN	302	—	260	349	CK	911
4	G3MCX	LDN	251	221	CK	278	CK	750
5	G4AGQ/M	SWX	235	211	CK	248	CK	694
6	G3BFP	LDN	160	154	CK	158	—	472
7	G2HLU	DOR	94	CK	104	227	CK	425
8	G4ARI	LEC	233	155	—	—	13	401
9	G0AHI	KNT	127	164	—	CK	87	378
10	GM4GRC	FFE	78	52	—	117	CK	247

Check-logs received with thanks from: G2FWX (SSB), G3CSR (CW), G3GLL (SSB) and G4QK.

FIRST 28MHz CUMULATIVES 1989, Results

Thanks to all who sent in logs, check-logs and comments to make this another well supported contest. The overall winner was G4RCG with an excellent set of logs producing a lead of more than 200 points, this was achieved with a TS930, FL2100Z and a four element beam at 60 feet. G0CPE won the CW section with an FT 757GX and a TH3JR. The SSB winner was G4WEY using a TS830, linear and a three element beam at 30 feet.

Most Entrants are now happy with the rules although G4AGQ would still like more than one hour per mode. From one or two comments, borne out by the logs, it would appear that inter G working was better than usual and contacts were made with counties further afield. Some DX was worked throughout the contest but the best sessions were on the 4th. May when many contacts were made with North and South America including the Falklands. G4RCG had told VP2EXX about the contest before the start on Thursday evening. VP2EXX made 150 contacts during the one hour SSB session! KZ1H came up on both CW and SSB. It was

generally felt that the first hour each week had more activity than the second, regardless of mode.

There were no duplicates and only one or two wrong calls but more points were lost through mistakes in the 'S' of the RST than from wrong serial numbers or Counties. G0CPE could have had another 42 points on SSB had he selected his best sessions but his position would not have changed. Had G4RCG entered sections 'a' and 'b' his scores would have been CW 512 and SSB 1061. Nice to see a brave entry from GM4GRC (op GM3YOR), only three other GM's appeared in the logs but maybe with a little encouragement more would join in and generate more points in that area. The Adjudicator is well aware of the problem of being out in the cold having been /P in CNL during the last session and only working one local, hearing G4RCG and G4WVX and some DX, G4QK had the same trouble in SOM on other sessions as well, although judging by the scores and comments conditions on the last night were very poor.

Looking forward to the next set in the Autumn and wondering if someone can knock up a score of 2000 points. Thanks again to all who took part, hope to see you again next time.

G3MCX

70MHZ FIXED STATION CONTEST 23rd APRIL 1989.

The band remains popular with stations for inter-G working and entry levels were steady considering that a session of cumulatives had finished a few weeks earlier. Many stations complained about the closeness of the 'fixtures' and the quantity of 'same band' contests, as well as the timing; an earlier start time would be preferred by fixed stations to limit operating to the morning only. This could be adjusted for next year. Your views please.

The QSO rates were encouraging and noticeably up on the previous year with class B licence holders now accounting for 20-28% of contacts in logs. This increased activity probably caused some of the QRM G6DER commented on around the SSB calling frequency ID 70.2MHz. He suggested that stations spread out more in future.

Conditions were moderate to poor, but despite this activity was noted from G. GJ, GM, GW and EI. G4RFR (Dorset) heard the TGB3ANG beacon for long periods, but many stations had difficulty in penetrating northwards; this was supported by GM3TAL (I086GA) who only worked four stations

and hence his apologies for only sending in a checklog.

G8EIK/P, G7AOG/P, GW3MHW and EI1CR were other stations who gave leading stations valuable multipliers from their respective areas where there was little other local activity.

Variations in standards of logkeeping were noted, and in several cases station callsign/QRA errors lost stations their best DX or positions, but the leading stations positions were unaffected.

Congratulations and certificates go to: G4RFR, Flight Refuelling ARS (winners, Open Section), G3NAQ (winner, Single Op. Section) and G3UKV (runner-up, Single Op. Section).

G8HHI

RSGB 7MHz CW CONTEST RESULTS FOR 1988

The Committee are delighted that the entry is again up substantially over 1987 for this Contest is proving very popular particularly amongst the Europeans and North Americans. The Committee would welcome more Logs from the considerable number of 'W' stations that took part.

It is excellent to see that the gap between the leaders has narrowed considerably compared with last year. I wonder if GW3YDX will be able to hold onto the 'Top Spot' in the next Contest, a position that he has now held for the past two years.

The equipment used by the three leading stations was:-

GW3YDX — Two Element Yagi at 95' TS9305 and G3FXB — Three Element reversible wire Beam, Bobtail curtain and T4XC/R4C.

G40BK — Quarter wave vertical with 2,500ft of radials; Three half waves at 75ft; Half wave at 50ft; 500ft Beverage and TS9305.

Countries worked by the leaders were:- 1200-1300 DL, HA, OK, PA, EI, LZ, UA1, Y, F, OE, UQ2, LA, HB9, UP2, YU, EA, OH.

1300-1400 UA9, UC2, SM, OH, I, EA6.

1400-1500 OH, YUO, UB5, EA6, UC2.

1500-1600 UL7, UJ8, VE7, YU, ON4, OZ.

1600-1700 UD6, VS6, OZ, VK3, JA, ZS, UJ8, ON4, VK2, I.

1700-1800 VK2, I, SVO, EA8, UM8, ZS, VS6.

1800-1900 ZL3, UI8, H8Q, VK6, C5, SP, ZS, EA8.

1900-2000 VK6, C5, JA.

2000-2100 SP.

2100-2200 H8Q, W2, VK8, W1, W4, T, W2, ZD8, W6.

2200-2300 LU, W8, W9, CT3, ZD8, CO, DU.

2300-2400 TI, VO, ZD8, W5, CO, W8, W9, W3, W5, VE1.

70MHZ FIXED STATION CONTEST 23rd APRIL 1989
Open/Multi Operator Section

Position	Callsign	Points	QSO	Mult.	Loc	Best DX	Km
1	G4RFR	28085	91	41	I090AS	G8PNN	496
2	G6APZ	16185	78	39	I093DC	GJ7AOG/P	426
3	G4HGI	5824	44	26	I083PL	G4RFR	305

Single Operator Section

Position	Callsign	Points	QSO	Mult.	Loc	Best DX	Km
1	G3NAQ	20286	74	46	I091HL	GM3TAL	523
2	G3UKV	18396	70	42	I082RR	GJ7AOG/P	385
3	G8EIK	12348	52	36	JO03AK	GJ7AOG/P	487
4	G4ULS	7750	50	31	I082TI	G0EHV	292
5	G3NKS	6960	44	29	I081XU	G8PNN	376
6	G4NBS	5880	42	28	JO02AF	GJ7AOG/P	362
7	G6DER	5356	36	26	I093GN	G4RFR	312
8	G4JNT	4824	35	24	I090JV	G4HGI	303
9	G3UAX	4250	42	25	I091LK	G4HGI	253
10	G4BYY	3825	33	25	I082TD	G0EHV	315
11	G0EHV	3094	20	17	I094FW	G4RFR	464
12	G3BFP	2780	37	20	I091WH	G6DER	265
13	G4ARI	1394	22	17	I092IQ	G4RFR	218
14	G8XYN	1024	20	16	I091OM	GJ7AOG/P	267
15	G3BPM	924	16	14	I080OW	G6APZ	253
16	G8DXC	814	14	11	JO02DL	G4RFR	244

Checklogs used and gratefully received from: G1GVA, G8EIK/P and GM3TAL.

CONTEST NEWS

0000-0100 W3, VE3 WO, VE2, 8P6, VE1, W6
EA6, CO, LU, VE7.
0100-0200 W7, W6, TI.
0200-0300 C6.
0500-0600 J6.
0600-0700 KH8, UA(FJL), UA2, ZL1, KL7.
0700-0800 ZL2.

7 MHZ CONTEST CW BRITISH ISLES

Position	Callsign	Score
1	GW3YDX	511560
2	G3FXB	367540
3	G40BK	353225
4	G3VER/P	353225
5	G3VER/P	298520
6	GM3YOR	282750
7	G3LET	224400
8	G3IGW	202520
9	G40DV	194590
10	G3TBK	168740
11	GW3HGJ	157640
12	G2QT	154840
13	G5MY	154580
14	G4ZOB	152190
15	G3SOX	126420
16	G4IQM	106330
17	G3VYI	96750
18	G3LIK	95260
19	G3NKS	90405
20	G3SWH	68640
21	G3HZL	64680
22	G4KKG	63425
23	GM4SID	61230
24	G3ESF	59430
25	G30LU	57800
26	G0EHO	55860
27	G3AWR	54325
28	G3MCC	37450
29	G3NKC	32900
30	G4HON	18755
31	G4FDC	17820
32	G0HCU	14500
33	G4EBK	12980
34	G4PKU	11500
35	G0HGA	10800
36	G40KN	10680
37	GW3SB	6935
38	G3COJ	6825
39	G3GMM	1590

7MHZ CONTEST CW AFRICA

Position	Callsign	Score
1	EA8AB	9990
2	ZD8JP	2940
3	C56/G3TXF	2430

7MHZ CONTEST CW ASIA

Position	Callsign	Score
1	RL7AB	16005
2	UA9FGJ	13530
3	UA9FAL	12450
4	UA9XHT	11400
5	UW9CK	10385
6	UJ8JW	9000
7	UA9FAN	8640
8	UL8GCO	7965
9	UL7GG	7695
10	UD6DKW	7425
11	UW9AU	6150
12	UV9DZ	4200
13	UL7EA	4050
14	UM8MCF	1635
15	UL8CWW	2700
16	JA3BCT	900
17	RA9XDO	840
18	UA1OT	588
19	UL7CD	495
20	R18BN	120

7MHZ CONTEST CW NORTH AFRICA

Position	Callsign	Score
1	NM2Y	13350
2	VE7CC	5805
3	W8XT	1425

7MHZ CONTEST CW OCEANIA

Position	Callsign	Score
1	VK2AYD	2610

7MHZ CONTEST CW CHECK LOGS

Position	Callsign	Score
1	EA5YU	—
2	DK9EA	—

Position	Callsign	Score
1	EA5GGV	—
2	C56/G3SXW	—
3	Y27IO	—
4	Y21EF	—
5	PA3AAV	—
6	L21MC	—
7	UB5GHG	—
8	UA1OZ	—
9	UB5MEC	—
10	UV6LKN	—
11	UA1NDR	—
12	UY5GG	—
13	VS6UO	—
14	UL7PHT	—
15	G3AEZ	—

7MHZ CONTEST CW EUROPE

Position	Callsign	Score
1	UA1DZ	7560
2	EI5DI	6360
3	L21V	6140
4	EA6ZY	5520
5	DL100	5460
6	Y25SG	5400
7	UV3AFB	5280
8	F9KP	4950
9	LA1IE	4920
10	EI7CC	4895
11	Y21YG/A	4850
12	DJOMBN	4785
13	Y47ZN	4750
14	Y26QO	4675
15	HA44KYN	4600
16	Y08CDQ	4455
17	SM3CER	4400
18	UB5IHH	4150
19	YU7SF	4125
20	4N2Y	4070
21	UP2BIE	4050
22	UA4RC	4015
23	RB5MA	4005
24	UB5ZBG	4000
25	Y05KTB	4000
26	DL1ZQ	3960
27	UB5JIB	3950
28	UA1UUA	3950
29	DF5KN	3920
30	Y37ZE	3905
31	UZ4WWB	3900
32	RB5GW	3850
33	Y47YM	3795
34	LA2UA	3700
35	Y64NH	3650
36	RB5FD	3550
37	EA3ALV	3520
38	O6MBQ	3500
39	Y55UG	3500
40	Y22KO	3470
41	OZ1GT	3450
42	F6EQV	3400
43	Y54CO	3245
44	UA4AGP	3200
45	HA4XX	3150
46	HGOD	3100
47	UZ1NWF	3100
48	PA3CWL	3050
49	Y21UDA	3050
50	YU1VF	2970
51	Y32P/P	2970
52	Y48YN	2970
53	PAOUV	2950
54	Y21YAB	2950
55	Y71QA	2950
56	OE3JPK	2925
57	OH1MDR	2835
58	FD1LMW	2800
59	LA9HFA	2750
60	DF3QN	2745
61	DL5XAS	2700
62	H89DX	2700
63	OH7NW	2650
64	UB5IHQ	2520
65	UY5SW	2475
66	PA3ALV	2400
67	EA2ID	2400
68	UB5OBC	2385
69	SP4GFG	2385
70	UA4AHA	2385
71	SM5DEV	2350
72	UB5LV	2295
73	UB5FCN	2295
74	DL9VDO	2250
75	RA3AN	2250
76	UA3QOB	2250
77	EA2CR	2250
78	DL2SBF	2205
79	UB5AER	2205
80	UA3AQO	2200

Position	Callsign	Score
82	HA2NI	2115
83	YU7KM	2115
84	UC2ADH	2070
85	HA3GA	2025
86	Y62NN	2000
87	Y05CUU	2000
88	LA1QDA	1890
89	PA3BNT	1880
90	UC2ADR	1800
91	Y21NM/A	1800
92	Y23KN/A	1800
93	Y24IK	1800
94	Y06LV	1760
95	OK1OFK	1755
96	Y31NJ	1665
97	FD1JNT	1620
98	Y32WF	1530
99	Y33UB	1530
100	Y56SG	1485
101	Y68SF	1440
102	PA2JCG	1435
103	UA3DMW	1360
104	RA3DGP	1295
105	HABIO	1280
106	UQ2GFU	1120
107	UT5LF	930
108	UY3SX	920
109	Y24ZM	885
110	Y25MG	840
111	Y23GD	795
112	Y24HB	760
113	Y23TL	714
114	Y35ZJ	630
115	UB4EX	500
116	OH1/DL1KAV	450
117	Y65LN	420
118	Y66ZF	420
119	UZ2FWN	390
120	Y04AAC	360
121	Y92ZL	315
122	Y38YB	275
123	Y22HF	225
124	Y23HE	160
125	Y04FJG	66

7MHZ CONTEST CW ASIA RECEIVING

Position	Callsign	Score
1	UL7-026-566	14685
2	UA9-084-1536	9450
3	UA9-090-601	4590
4	UA9-130-1305	3720
5	JA1-7777	135

7MHZ CONTEST CW BRITISH ISLES RECEIVING

Position	Callsign	Score
1	BRS1066	75600

7MHZ CONTEST CW EUROPE RECEIVING

Position	Callsign	Score
1	UA1-113-18	5335
2	RB5.067.184	5280
3	UA1.113.630	5060
4	UA1.143.1	4455
5	UA3.170.565	3355
6	UC2.007.401	3150
7	UC2.007.401	3050
8	UB5.075.145	3000
9	L21.M.333	1520
10	Y55-10-A	345
11	OK2-31714	200
12	Y38-12-F	100
13	Y38-16-B	120

CONTEST LOG SHEETS

Readers are reminded that both HF and VHG logsheets are available from Headquarters in packs of 100. Prices (which include postage and packing) are £3.29p for RSGB members and £3.87p for non-members. When ordering please remember to specify which type of log sheet is required. Send your orders to: **RSGB Sales (CWO) Lambda House, Cranbourne Road, Pottery Bar, Heris EN6 3JE.**

CONTESTS CALENDAR

RSGB HF CONTESTS

5 Aug	Ropoco 2 (Jul89)
20 Aug	DF Qualifying Event 7 (Darford Heath)
23 Sep	SSB Field Day (Jul89)
10 Sep	DF Qualifying Event 8 (Chelmsford/Colchester)
24 Sep	DF National Final (Coventry)
8 Oct	21/28MHz Phone (Jul89)
9 Oct	28MHz Cumulative
15 Oct	21MHz CW
17 Oct	28MHz Cumulative
25 Oct	28MHz Cumulative
28 Oct	Mollart Memorial Triple DF Night (Mid-Thames)
2 Nov	28MHz Cumulative
10 Nov	28MHz Cumulative
11 Nov	Club Calls Contest 'CCC' - all modes & SWL (Sep89)
18,19 Nov	Second 1-6 MHz CW (Sep89)

RSGB VHF CONTESTS

Aug	432MHz Activity Contest (Jul89)
5 Aug	144MHz Low Power (May89) & SWL (Jun89)
6 Aug	432MHz Low Power & SWL (Apr89)
13 Aug	10GHz Cumulative (Mar89)
23 Sep	144MHz Trophy/IARU VHF & SWL
9 Sep	24GHz Cumulative (Mar89)
10 Sep	10GHz Cumulative
17 Sep	70MHz Trophy & SWL
7,8 Oct	432MHz-24GHz/IARU UHF/SHF
13 Oct	432MHz Cumulative
21 Oct	1-3/2-3GHz Cumulative
29 Oct	432MHz Cumulative
4,5 Nov	144MHz CW
6 Nov	1-3/2-3GHz Cumulative
14 Nov	432MHz Cumulative
22 Nov	1-3/2-3GHz Cumulative
30 Nov	432MHz Cumulative
3 Dec	144MHz Fixed & AFS & SWL
8 Dec	1-3/2-3GHz Cumulative
9 Dec	50MHz CW
10 Dec	70MHz CW

OTHER CONTESTS

29,30 Jul	Venezuelan Independence Day Contest (Jun89)
9,10 Sep	European DX SSB Contest
12,13 Aug	European CW DX Contest
19,20 Aug	Seant 89 Contest (Phone) (Jun89)
26,27 Aug	All Asian DX CW Contest (Jun89)
3 Sept	Bulgarian DX Contest
7,8 Oct	VK/ZL Oceania DX SSB Contest
14,15 Oct	VK/ZL Oceania DX CW Contest
28,29 Oct	CQWW DX SSB Contest
11,12 Nov	Czechoslovakian Contest
25,26 Nov	CQWW DX CW Contest
1,2,3 Dec	ARRL 160M CW Contest
9,10 Dec	ARRL 10M Contest

First Tuesday each month 144MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Thursday each month 432MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Monday each month Microwave Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)

Dates of publication of rules in RadCom are shown in parentheses.

Versatower: First Choice 1963 - XXV - 1988

A range of telescopic towers in static and mobile models from 7.5 to 36 metres with tilt-over facility enabling all maintenance to be at ground level.

Designed in accordance with CP3 Chapter V: part 2: 1972 for a minimum wind speed of 85 mph in conditions of maximum exposure and specified by professionals world-wide where hostile environments demand the ultimate in design, quality and reliability.



Available from
Strumech Versatower Limited,
Portland House, Coppice Side,
Brownhills, Walsall, West Midlands
WS8 7EX, England.
Telephone: (0543) 452321
Telex: 335243 SEL G.
Fax: (0543) 361050

Agents in
West Germany, France,
Netherlands, Belgium, Sweden,
Switzerland, Norway and Italy.

VERSATOWER RANGE

	Sections	Retracted		Extended
		No.	M.	
Mini Series	3	4.5	9.0	
"E" Series	3	6.7	13.7	
Standard				
Series 13M20	2	7.8	12.0	
	3	8.0	18.0	
	4 + Tube	8.15	24.0	
Heavy Duty				
16M20	2	7.8	12.0	
	3	8.0	18.0	
	4 + H.U.	8.15	24.0	
	5 + Tube	8.25	30.0	

Retracted - Extended heights listed, nominal only

Extended Height: Ground level to centre of Array.

All applications subject to:

Maximum permissible head load - weight/area.

Exposure of location - maximum wind speed.

Note models marked * supplied with obligatory Guys.

All models - choice of ground mounting.

Technical Staff available to advise on model selection.

Authorised Dealer
SMC South Midlands
Communications Ltd
School Close
Chandlers Ford Industrial Estate
Eastleigh
Hants. SO5 3BY

GAREX ELECTRONICS WEATHER SATELLITE SYSTEMS

SPECTACULAR NEW ATARI ANIMATED SYSTEM

Garex are proud to announce that they are the first appointed dealer for this incredible new Timesteg product. Following on from Timesteg's phenomenal success in the education market a special low cost Atari ST version of their animation system is now available. Simply plug in your existing receiver to view amazing pictures. For the ultimate, add a Meteosat receiver for unbelievably smooth 14 frame animation that is completely automatic once set up. Just watch the clouds roll by! New pictures are added twice an hour if required, the oldest being discarded automatically. This sophisticated package will run on any Atari ST1040 and compatible colour monitor, comes complete with all software and colour-keyed Atari interface unit.

Optional 16 grey scale adaptor for colour monitor

For those who would like a one-stop-shop, we offer the complete package of a ready-to-run system:

Meteosat Dish and receiver, Atari interface unit, Grey scale adaptor, 14in Colour Monitor, Atari ST1040 computer, software (including demo-disc) AND, OF COURSE, ALL PLUGS AND CABLES.

On your doorstep £1,695.00

NEW COMMODORE "AMIGA" INTERFACE AND SOFTWARE

Superb high resolution pictures 600 pixels x 400 lines. Compatible with "PIXmate" THE fully featured image processing program.

£299.00

COMPACT FRAME STORE SYSTEM

The basic MICROWAVE METEOSAT system, no complications, a complete plug in and go package requires no computer, no software, and can be up and running, including dish alignment within 10 minutes. Nothing more to buy: Dish, Microwave Receiver, Frame Store, 12in b/w Monitor AND ALL PLUGS AND CABLES. Designed by Timesteg, supplied by Garex

£995.95

SATELLITE ACCESSORIES

Meteosat Receiver, Dish input and 2 watt audio output

£270.25

Meteosat Preamp. 15dB gain 0.6dB noise figure GaAs FET

£92.00

NOAA 10 channel VHF Receiver

£155.25

NOAA BASIC Turnstile antenna

£34.95

NOAA BASIC Preamp, 3 pole filter, boxed, 14dB gain

£24.95

SAE for full details and prices of other 'separates'

* * * *

GAREX VHF RECEIVERS

* A simple but versatile design capable of covering spot frequencies in the range 25-200MHz.

* Excellent sensitivity (typically 0.4uV for 12dB SINAD)

* Double superhet (10.7MHz and 455kHz IFs)

* Choice of IF bandwidths from "W-SAT" to "12.5kHz" PMR standards.

* The basic receiver is single channel crystal controlled.

* Multichannel option.

* 2 watt audio output stage having a low quiescent current.

* Size: 153 x 33 x 13mm

* Requires 10-14v DC supply

PRICES Stock Versions: (fully assembled, aligned and tested boards) 6m, 4m, 2m and weather sat

£49.95

Crystals extra, prices on request.

* Mains power supply module

£15.50

Other frequencies, special options, cased versions

POA

GAREX VHF PREAMPLIFIERS

* MINIATURE - GENERAL PURPOSE *

* Compact size: 34 x 9 x 15mm

* Up to 26dB gain

* Can be made for any frequency in the range 40-200MHz

* 3dB bandwidth ±3MHz (at 145MHz)

* Low noise

* Input and output impedance 50 ohms

* 1dB compression ±10dBm

* Saturated output ±15dBm

* Supply voltage 8-17v DC at 5-10mA

Stock Versions (fully assembled, aligned and tested boards) 6m, 4m, 2m and

Weather Sat

£11.45

Airband 118-136MHz (reduced gain)

£11.45

Other frequencies in the range 40-200MHz

£13.75

* HIGH PERFORMANCE

* 2 meter PRE-AMPLIFIER

* 3 band-pass stages for improved selectivity

* 16dB gain with 1dB NF

* Switches 35 watts

* RF switched (fail-safe action): gas-filled relays

Assembled, tested pcb

£42.50

Boxed version

£49.95

Gas-filled Relays as used in pre-amp

£4.95

MAIN DISTRIBUTORS FOR REVCO ELECTRONICS LTD

Prices include UK P&P and 15% VAT

Ask for details of our interest Free Credit

GAREX ELECTRONICS

HARROW HOUSE, AKEMAN STREET, TRING HP23 6AA

TEL: TRING (044282) 8580

and CHEDDINGTON (0296) 668684

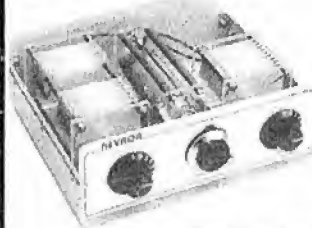
Callers by appointment only



NEVADA

HIGH QUALITY BRITISH MADE PRODUCTS

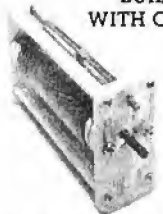
NEW TM 1000 2kw All Band ATU



Our unique wide band roller coaster enables effortless matching of G5RV, LW, Vertical and Coax fed antennas with this unit

Standard model £168
For balanced feed £199
Fitted with 2kw Balun
TM1000 Kit complete £138
(Add £5 carriage for all versions)

BUILD YOUR OWN HIGH POWER ATU
WITH OUR RANGE OF ATU COMPONENTS



Roller Coaster 2kw 30µH £28
Var Cap 250pF 1kw £19.95
Var Cap 250 + 250pF 1kw £28
Turns Counter (For R Coaster) £14.95
Empty ATU Case £26
2kw Balun Assembly £28

WE ARE THE UK SCANNER SPECIALISTS

NEW MODELS - JUST ARRIVED!

STANDARD AX700 - (50 - 904 MHz)
With Panoramic Display
AOR 3000 (100 KHz - 2.2 GHz)
New Base Receiver £575

HANDHELD SCANNERS
Black Jaguar MkIII £765
Beatec 200XLT (W 900 MHz) £199
Beatec 100XLT £229
AOR 900 (W 900 MHz) £199
AOR 900 (W 900 MHz) £235

BASE/MOBILE SCANNERS
Beatec 950 XLT (W 900 MHz) £249
Beatec 800 XLT (W 900 MHz) £229
Beatec 175 XLT £169.99
AOR 2002 £487
Cobra SR925 Base RX £149



REMOTE
ANTENNA SWITCH

(For masthead mounting)
Freq DC - 1.2 GHz
Power 300W P.E.P.
Insertion Loss 0.19 dB at 900 MHz
Connectors Green Pat 'N' Type

£49.95

ALLOWS SELECTION OF 2 ANTENNAS FROM 1 COAX FEEDER

DISCONE ANTENNAS - New British Made Antennas

Nevada WB1300 (25-1300 MHz)
Wideband Top of the range
stainless steel £59.95

Nevada Discone
(50-700 MHz)
High Quality
8 Element
£24.00

Nevada PA15
Base Antenna 100-960 MHz.
A new Colinear Ant with over
9dB gain at 900 MHz £49.95
(*£4.60 P&P)

NEW
BUMPER
CATALOGUE
£2 Includes £20
worth of
vouchers

USE YOUR CREDIT CARD FOR IMMEDIATE DESPATCH
HOTLINE (0705) 662145

NEVADA COMMUNICATIONS
189 London Road, North End,
Portsmouth PO2 9AE. Fax: (0705) 690626

The new
magazine for
vintage radio
enthusiasts

RADIO
BYGONES
INCORPORATING THE RADIOPHILE

■ Whether your interest is in domestic radio and TV or in amateur radio, in military, aviation or marine communications, or in commercial systems fixed or mobile, **RADIO BYGONES** is the magazine for you. Covering developments from the days of Hertz, Maxwell and Marconi to what was state-of-the-art just a few short years ago. Articles on restoration and repair, history, reminiscences and just plain nostalgia - you'll find them all. Plus features on museums and private collections with colour pictures of some of their most interesting exhibits.

■ **RADIO BYGONES**, which incorporates Chas Miller's popular magazine for domestic radio enthusiasts *The Radiophile*, will be published six times a year. The first issue will appear in mid-August 1989. Subscriptions to **RADIO BYGONES**, price £12.00 for one year by post to UK addresses (£13.00 to overseas addresses by surface mail), are available from the Publishers at the address below. Copies will also be on sale at selected museums and specialist outlets price £2.20 each.

■ You can obtain a sample copy of the first issue of **RADIO BYGONES** by sending your name and address, together with a cheque or postal order for £2.00 including postage (or £2.20 for overseas addresses) to the Publishers: G C Arnold Partners, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ. Overseas payments must be in Sterling.

INDEX TO ADVERTISERS - AUGUST

A J H Electronics	26
Allweld Engineering	62
Amateur Radio Insurance Services Ltd	33
Amcomm of London	55
AMDAT	61
ARE Communications Ltd	59
G C Arnold Partners	76
Arrow Electronics Ltd	58
J Birkett	60
Blue Rose Electronics	68
Bredhurst Electronics	61
The C R Supply Company	62
C-Fone	77
Cambridge Kits	26
Cellnet - The Cellphone Network	78
Datong Electronics Ltd	26
Dee Comm Amateur Radio Products	60
G4ZPY Paddle Keys	26
Garex Electronics Ltd	75
Hately Antenna Technology	60
ICOM (UK) Ltd	56, 57 & IBC
ICS Electronics Ltd	27
J & P Electronics Ltd	62
KW Ten-Tec	60
Lowe Electronics Ltd	28, 29 & IFC
Maplin Electronics Supplies Ltd	78
Myandering Limited	68
Nevada	76
Photo Acoustics Ltd	69
Quartslab Marketing Ltd	58
R N Electronics	58
Random Electronics	62
Relcom Communications Ltd	78
Revco	69
Siskin Electronics	68
South Midlands Communications Ltd	30, 31, 32 & OBC
Spectrum Communications	61
Stephens James Ltd	68
Strumech Versatower Ltd	75
Technical Software	58
Uppington Tele-Radio	60
Waters & Stanton Electronics	70
Colin Wilson	68

CLASSIFIED ADVERTISEMENTS

Classified advertisements 40p per word (VAT included), minimum £6.40
Box Number £2.00 extra to wordage or minimum.

Semi display 1/8 page 2 1/4" x 3 1/2" (57 x 91mm) £96.00
 3/32 page 1 1/4" x 3 1/2" (42 x 91mm) £74.00 + 15% VAT
 1/16 page 1" x 3 1/2" (26 x 91mm) £52.00

Please write clearly. No responsibility accepted for errors.
 Latest date for acceptance — 7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.
 Copy and remittance to: **Victor Brand Associates Ltd.,**
 'West Barn', Low Common,
 Bunwell, Norwich, Norfolk, NR16 1SY.

Cheques should be made payable to **RSGB.**

Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send SAE for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey. (073 72) 44916.

AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP Electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.

PERSONALISED QSL CARDS, 1000 £19.00; 5000 £60.00. 5000 gloss in two colours. £88.00. Send SAE for samples (DIY QSL's/SWL's + state which!! — 100 mixed designs/colours, £2.50. C.W.O. Q/Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.

QSL CARDS. Try me for quality and price. SAE for samples. A. W. Bailey (G3YNI), Brean Down Press, 78 Alfred Street, Weston-Super-Mare, Avon BS23 1PP.

G4T JB QSL CARDS printed to your specification, choose from 15 matt, 14 gloss colours of card. DIY matt £2.75 (100) gloss £3.95 (100). Logbooks £2.50. Bureau envelopes, Morse oscillators, mobile antennas, Agents for Navico, 50MHz linear amps, Photo cards, power supplies, cavity wavemeters, 24v to 12v converters. For samples and full product list SAE to 24 Portishead Road, Worle, Weston-Super-Mare BS22 0UX. Tel: 0934-512757.

GWM RADIO LIMITED, 40-42 PORTLAND ROAD, WORTHING, WEST SUSSEX BN11 1QN. Tel: 0903-34897. Pye Westminster W15FM low bank O.K. for 4m units only £25.00. Pye PF2UB units with speaker/Mic no Batts. O.K. for 70cms £25.00. Pye PF28 low band FM units with speaker/mic no batts O.K. for 4m £25.00. Pye Olympic M201 VHF high band A.M. units only £25.00. ITT AM 7 Mid-band units (107MHz TX 139 MHz RX) Ideal for modification to Air/Glider band. Units only £15.00. Power-one international series type HB15-1.5A output 15 V.D.C. at 1.5A as new boxed with spec sheet open frame PSU only £15.00. Gould Econoflex type EX5-20/N open frame — switch mode output 5V at 20A as new boxed with spec sheet only £30.00. All prices include VAT and post and packing.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET" like Police, Ambulance. Medium £9.00. Large £9.50. XLarge £10.00. "RAYNET CONTROLLER" 50p extra. Nonreversible Battery Connectors (10 pairs/pack) £4.00. Mike Watson G8CPH, Ipswich, (0473) 831448.

PUT TOP BAND into your FT707 or FT77 for just £29.95. One of the many kits from KANGA PRODUCTS. Send LSASE for free catalogue. 3 Limes Road, Folkestone. 0303 276171.

QSL CARDS clear plastic hanging display wallets. Hold 20 large size cards. Pack of 3 £2.90. Viola Plastics, 36 Croft Road, Hastings, Sussex.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full Details shown in our Handbook, price £1.25 refunded upon purchase of Antennae. Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX (Administrative address only).

ANTI-TVI TRAP DIPOLES & TRAPS for DIY Tribander Beams. Aerial D.I.Y. Bits, Baluns, Data. 28pSAE. Aerial Guide £1.00 G2DYM, Uplowman, Devon, EX16 7PH (03986) 215.

PROCOMM (UK) — Used amateur radio equipment bought for CASH, part exchange welcome. SAE for stock listing. 102 Larkhill Road, Abingdon, Oxfordshire. 0235-32653 (Callers by appointment).

G2VF DIY PROJECTS Loop Antennas Pre Amps etc. Photo Copy HRO Manual. SAE details: Rylands, 39 Parkside Avenue, Southampton SO1 9AF.

NAVICO AMR1000 £227.30, AMR1000S £277 and all other Navico goods, ask for list. MET antennas, Uniden scanners, Co-ax cables, plugs and connector. G4GKU Minibeam £79.98 + £3 p.p. Marine radio telephones and antennas. Send or phone for free list. Seaward Electronics, Lynstone Trading Estate, Bude, Cornwall, Tel. 0288 55998 or after 6pm 0288 4892.

THE PC289 QRP PHONE/CW 160m transmitter is now in production. Not a kit. £24, see to JC Electronics, 2 Mostyn Avenue, Prestatyn, North Wales LL19 9NF.

WEATHER STATIONS — Wind direction, wind speed with maximum gust speed, barometer, outside temperature with max & min., C&F. In very attractive wooden cabinet. Sensors mount on existing mast, 25 metres of cable supplied. For leaflet telephone (0843) 221622. R&D ELECTRONICS, 318A Northdown Road, Margate, Kent CT9 3PW.

CALLSIGN CAPS. Blue Red or Black baseball cap with your callsign. Send £3.70 inc p.p. M.J. Hilton, 3 Highfields, Heswall, Wirral L60 7TF.

G3LLL OFFERS. Black Star 600MHz counters. Super quality & value; we use one: £145.00 p.p. (Also 2.4GHz £335.00 p.p.). Datong ASP wired 707, 757, 747, "Better than any legal Linear". CW Filters FT101ZD, 902, 107, 707 & 102 £40.00 p.p. Ten-Tec Paragon & Corsair on dem. 24 Amp PSU's, Daiwa & Drae. Scanners. Valves & Mod kits for FT101's. 15 mins Junc 31 M6. Free parking. Phone re opening hours. Holdings Amateur Electronics, 45 Johnston St, Blackburn BB2 1EF. (0254) 59595.

QSL CARDS. Gloss or tinted cards, SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau, Ffestiniog, Gwynedd LL41 4P.

GW3COI CARDS PERSONALISED FOR QSL'S, greeting cards etc from £7.00. GW3COI, Penrhynbach, Abersoch, Gwynedd. Tel 2675.

SPECTRUM FBAX 25 PACKET RADIO SYSTEM now available in software £49.00. As featured in PW Nov '88 issue. Interface/Modem with printer port supplied extra of full details to make free with software. Z21FB Box 1215, Harare, Zimbabwe.

POLYPROPYLENE GUYROPE. Don't waste money on small quantities. Buy a 220 metre coil! 4m £15.00, 6mm £20.00, 8mm £28.00. Cheques — "Rope-Link", Cadence, Battle Road, Heathfield, Sussex TN21 9DR.

J C ELECTRONICS would like to say "Thank you" to our customers for your interest in our PC289, QRP Transmitter only £24.00. Details sae. 2 Mostyn Avenue, Prestatyn LL19 9NF.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Sarah Baylis or Jenny Lovell, Amateur Radio Insurance Services Ltd, 4a Russell Hill Road, Purley, Surrey CR2 2LA. Tel: 01-660 0820 or Fax: 01-660 9222.

COMPUTER SOFTWARE HARDWARE

SCOTLAND PACK-AGE! for AEA, Kantronics, PAC-Comm, WX Stations and computers, Atari-ST, WE FAX software for KAM-£15 PACK-AGE, Braeside, Urquhart, Crossford, File KY12 8QJ (0383) 721169.

AMSTRAD/IBM PC COMPATIBLE SOFTWARE. Large SAE to Charles Crane G4YFN, 2 Pimento Drive, Earley RG6 2GZ.

PSION ORGANISER. Comprehensive logging program. Fast recall plus very flexible Morse tutor, 5-20wpm, letters, figures or words. Ring Dick Edwards, Great Yarmouth (0493) 652418.

THE G4TYF LOG — Date, Band, Power, Mode, Callsign QTH, Name, TX/RX Reports, Auto time, Find, Search, Printout logbook style, Own filing system. QSL log, Network facilities. Only 4 inputs. Nice screen display, Commodore 64 BBC + Master. Spectrum £17.00. Package includes free resistor decoder. Send callsign. E Aston, 64 Gurney Valley, Bishop Auckland DL14 8RW. (0388) 607500.

PSION ORGANISER FULL FEATURE MORSE TUTOR. Random letters, numbers or type in your own test texts to play back as Morse. £28.00 on 16K Datapak or £8.00 on your blank 16K Datapak. J. Spillet, Baytree Cottage, Crabbwood Lane, Sway, Hants SO41 6EQ.

HOLIDAY ACCOMMODATION

FLYING FROM GATWICK? Stay at Mill Lodge Guest House. 4 minutes from airport. Transport available. Telephone (0293) 771170.

HOLIDAY IN CORNWALL? Stay at Clifton Farm, B & B, E.M. Six Berth Caravan, Camping. All set in a very secluded location near Truro. (G4LJY) 0872 863849.

NEWQUAY, CORNWALL. Hotel Corniche, Mount Wise, Centrally situated. Bar, Parking. Five minutes beaches. Colour television and teamakers all bedrooms, some en-suite. Free Child offer. Phone G4TGG 0637 876618.

ELEVATED SITE, use of shack, B&B, Caravan, Bunk House, Camping. Open all year. "Tynrhos", Mynytho, Pwllheli LL53 7PS. (0758) 740712.

TORQUAY QUALITY HOLIDAY APARTMENTS for families and couples. Vacancies 26th August covering Tars Rally. (0803) 607333.

MISCELLANEOUS

HEATHKIT UK spares and service centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Gloucestershire. Telephone (0684) 73127.

PAYL SCHOOL. Puzzled by Physics, Radio Electronics? Afraid of exams? Want to write? Try Pay-As-You-Learn. £2 each lesson with follow-on. Without obligation write your requirements with s.a.e. to G1NAK, Chylean, Tintagel, Cornwall PL34 0HH. (0840) 212262.

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, Career and Professional examinations etc) write or phone — The Rapid Results College, Dept JT17, Tuition House, London SW19 4DS. Tel 01-947 7272 (9am-5pm) or use our 24hr Recordcall service 01-946 1102 quoting JT17.

VINTAGE WIRELESS BOOKS/MAGS wanted and for sale. Send for lists — state requirements. Quilltech, 26 Woodside Road, Kingston-on-Thames, Surrey KT2 5AT.

PATENTS, TRADE MARKS AND DESIGNS. Literature on request. Kings Patent Agency Limited, Established 1886, 73 Farringdon Road, London EC1M 3JB. Telephone 01-248 6161. Telex 883805 and Fax 01-831 9306. (G5TA, G3ZZE).

Due To Continued Expansion We Require
*****SERVICE & INSTALLATION ENGINEERS*****

CFONE

Call Now
01-573 4541

PROJECT/COMMISSIONING ENGINEER

We are a fast growing company in the field of Mobile Radio Communications, covering all activities from trunked PMR systems to cellular radio.

Due to expansion of our activities, we have an urgent need to recruit an engineer to take full responsibility for design, project engineering and on site commissioning of our range of communication systems.

This new position requires an ability to work with the minimum of supervision and to be responsive to the needs of customers.

The ideal candidate will be a dynamic self motivated individual qualified to at least HNC level with a keen interest in radio and a desire to work in a friendly rapidly developing environment. Previous experience of commercial radio and PMR systems would be a distinct advantage.

The generous compensation package will reflect the importance that we attach to the position, and will include a car and normal large company benefits.

Applications including a CV should be sent to:

Richard McLachlan
RELCOM COMMUNICATIONS LTD
Winslow Road,
Hammersmith Industrial Estate, London W6 9SF.
Tel: 01-741 8581

COMMUNICATIONS TECHNICIANS

Throughout the UK

To £9,000 p.a.
(Excluding Inner London Weighting)

Experienced technicians are required by Cellnet to maintain its advanced technology cellular radio network. Due to the continuing rapid expansion of the business there are opportunities to work on base site maintenance at locations throughout the country. You will be playing a key role in the success of this challenging and exacting business.

We are looking for technicians aged 21+ with at least two years experience of maintenance and testing of UHF radio equipment and associated micro processor control systems, who are enthusiastic and keen to learn. Although BTEC/ONC, or equivalent qualifications would be an advantage, they are not essential if you have the appropriate experience. Applicants must however hold a full clean driving licence.

With full in-house training provided you will be encouraged to develop your professional skills and system knowledge, and there are excellent prospects for career progression.

Generous benefits include 23½ days holiday, company pension and sick pay schemes, and access to good recreational facilities.

In the first instance please write with full c.v. to
Theresa Herbert, TSCR Ltd., 100 Bagot Street, Aston,
Birmingham B4 7BA.

British Telecom is an Equal Opportunities Employer.
Applications are invited from suitably qualified individuals
regardless of sex, racial origin or disability.



Maplin

Do you Enjoy your work?

Or would you prefer to

Work at what you enjoy?

If you are an electronics enthusiast and looking for an interesting career with a future, Maplin has the answer.

We currently have vacancies for

TECHNICAL SALES STAFF

in LONDON, READING, BRIGHTON and NEWCASTLE

These vacancies are being created as a result of the Maplin expansion program and offer real prospects up to and including Branch Management.

Both junior and experienced people will be considered. A knowledge of sales, although an asset, is not essential. But, to become part of the team you do need to be self motivated and have a cheerful personality. Applicants should also be smart and have a knowledge of electronic components.

We offer excellent working conditions and job security, plus a good salary with commission and a realistic pension scheme.

Apply in writing enclosing CV to: Keith Evans, Maplin Electronics, 8 Oxford Road, Manchester, M1 5QA.

If you are seeking an interesting career in a Hi-Tech environment then contact us **NOW!**

Members' Ads

Conditions of acceptance are published on the Members' Ad order form inserted into the wrapper with every issue of *Radio Communication* posted to members. This form must be used when placing an advertisement; and please note that FOR SALE, WANTED and EXCHANGE advertisements must not be mixed on the same form. A new, more flexible, pricing scheme has been introduced. Details are on the form. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidized service to members, no correspondence can be entered into.

FOR SALE

● SWAN 100MX mobile HF tcvr. Little used: £260. Swan 20A PSU: £40. G4HRT QTHR. 0532 665568 after 6pm.

● SHACK clearance. Starting with my faithful Trio TS700. GWO: £250. 100W linear: £80. 10/12A PSU: £10, with or after linear. Scope, other test gear, transformers, other components. SAE for lists. G8YBF. Write QTH pref'd or leave message/enq 061-477 5303.

● FDK Multi 750 XX 2m multimode. 2W and 10W. Fitted keyer unit can be adjusted to 20W. Orig. packing and accs. One owner. 3yrs old. Bargain. £175. (Leeds) 0532 676949.

● TRIO 7200G 2m FM mobile 10/1W 22ch RO-R7 8, 11, 13, 20, 21, 22, 3. Good cond. c/w m/bracket and manual: £90. G8MMN QTHR. 0282 843725.

● ELEMENTS for Bird wattmeter. 100 or 50W rating. 100-250MHz. Please send details and cost to GM1XHZ QTHR.

● YAESU FT980 mint cond. c/w box, leads, inst book. Fitted keyer unit: £895.00. Not QTHR. (Redditch) 0527 45158 or 0836 345405.

● ICOM 735 as new, in orig packing: £725. Galvani electronic organ. Two manual pedals 15 rhythms: £100. BC1 SLR camera outfit m/ auto. 50mm, 35-70mm, 80-200mm lenses. Dedicated flash, shoulder strap and carrying case. As new: £150. All ovno. G3NQO. (Essex) 0702 218646.

● YAESU FT290R, nicads, chrg, usual accs: £180. Sony ICF2001 Mk1, synthesised HF/VHF RX: £85. Welz SP220 HF/VHF pwr meter 2/20/200W 20MHz: £45. G4FUI QTHR. (Penrith) 0768 66728.

● YAESU FT102 AM/FM fitted repeater 1/burst. FT707DM digital VFO U/D scan 12mhz. FT107R tvtr c/w 2m mod. SP102 spkr, K/wood MC35S I/mic. All manuals. Will not split. VGC: £875. Neelone 12A PSU VHF supp: £50.00. Brian, GIUWV QTHR. 0425 615860.

● SUPERB VHF/UHF QTH. 600ft ASL yet only 15 miles central London. Flint and brick semi-detached period cottage in completely rural location within the sought-after area of Downe, Kent. 6 miles Bromley. 3 beds, dining room, sitting room, fitted kitchen, bathroom, detached garage, full CH etc. 60ft HD tower, 66 countries worked 144MHz. Offers in the region of £160,000. Clive Penna, G3POI QTHR. 0959 75992.

● TRIO/Kenwood TR2400 2m FM h/held. Fast chrg, base stand, soft case, strap, box, full inst, spkr/mic. All VGC: £100. Also 14le group C/D UHF TV ant, inc 3m coax fitted: £7. Jeremy QTHR G7AIL.

● TELEREADER CD660 decodes RTTY/CW/ASCII/TOR. Also has CW tutor RX and TX. This unit is in exc cond. Comes c/w all interconnecting leads: £150. Datong FL3 with auto notch, as new: £100. G4SLG QTHR. 0522 751920.

● HF linear amp FL2100B: £400. HF tcvr Trio TS180S: £450. Rotator med/heavy KR400RC: £100. Ray G4ILQ. (Kidderminster) 0562 824930.

● 6M amp, BNOS LPM50-10-100 100W linear amp and preamp, very recently serviced: £175. Peter G3ZSS. (Cobham) 0932 63552.

● SHACK clearance! Sony ICF2001 multimode rcvr: £100.00. Excalibur multimode homebase, boxed, for 10m conversion: £80.00. Harrier FM homebase: £60.00. Hy-gain-V multimode, needs attention: £30.00. Desk mic for scrap, v tatty: £5. Lower offers accepted if not sold. G1YLP QTHR. (Cheltenham) 0242 680248.

● 813s x2 with bases: £35. DNT 29MHz B40FM tcvr: £40. Eumig Super-8 cine. Bell and Howell projector: £25. Pye cassette recorder: £15. Bremi 13.8V/3A PSU: £15. Alphacomp 32 printer: £15. All ovno. John, G4BZO QTHR. (Telford) 0952 727024.

● COLLINS 30LI HF linear 500W O/P 240V.

Exc. cond. H/book and 2 spare PA valves: £500. 75S3B S-line HF RX 240V. Exc. cond. H/book and some spare valves: £275. Buyers must collect. Cash only. G3SPJ QTHR. 01-311 8405.

● YAESU FT23R 2m h/held, PA6, DC adaptor, FN812 pack, NC18C chrg: £200. Yaesu FP4 4A PSU: £15. Yaesu PA4C, AC adaptor for FRG9600: £10. Barlow Wadley XCR30: £50. G2DYM Irap dipole 80/10m. Unused: £35. Datong active ant AD370: £35. Heathkit electronic keyer HD1410: £25. Heathkit 2m FM amp 10W HA201A: £10. Microwave Modules 2m 30W amp: £25. Small MFJ ATU 100W: £25. MFJ noise bridge MFJ202 with resistance and reactance: £30. Drake dummy load DL300: £5. RF field strength indicator: £5. Hansen swr indicator: £5. SEM wideband preamp: £15. Yaesu active ant FRA7700: £25. Amstrad 6128 computer, colour monitor, games, books, little used: £200. Datong FL3 filter: £60. All post extra. (Devon) 0392 877819.

● BBC-B items. 6502, 2nd processor: £55. Teletext decoder unit: £55. Both made by Acorn, cased HH/DS 80T drive: £45. Speech recognition system: £30. Use mic instead of keyboard on RTTY or packet, ADI ROM, manual: £15. Jim 0202 518828.

● HAMEG 60MHz scope with X1/X10 probe, manual: £320.00. Prefer buyer collect. (Bristol area) 0761 71392.

● JAYBEAM MBM88/70: £28. Buyer collects. G3WCE QTHR. (Norwich) 0603 53331 after 6pm.

● TEN-TEC Argosy Mk1 with CW and AF filters fitted plus NB and 10dB atten RX-mod, type 225 ATU, no split. Orig. packing and manuals. Good starter for HF: £450.00. Buyer inspects and collects. Time wasters not welcomed. G4GJC QTHR. (Milton Keynes) 0908 644253 after 7pm.

● AOR 2002 scanner. Cost £487. Accept: £385.00. 0266 45527.

● FT707 HF tcvr 100W with FC707 matching ATU with YM35 mic. Also Adonis comp mic, m/ mount, bkt, boxed. Mint cond. £360. KW107 ATU: £50. Hi-Mound morse key: £10. Datong morse tutor: £30. FT290 plus 30W linear, mic, case, nicads, chrg: £220. FT101Z HF tcvr 100W. Boxed. Needs new driver valves: £210. Hansen swr bridge: £10. SMC swr bridge: £10. Belcom 2m scanner: £10. Trio R600 HF rcvr 550kHz-30MHz: £120. FT227R 2m mobile rig: £120. 30A PSU 12V: £60. HB9CV 6m 2ele yagi: £10. Jaybeam 48le paraband: £10. Both never used. Carr. extra on all items. 0202 534933 after 6pm.

● FL2100Z 1200W HF linear used 4hrs only. Mint: £595. FT101E as new: £325. FT75 50W PEP HF mobile rig inc VFO/CFO. 5-band VFO or VFO operation. VGC: £150. Daiwa NS660P swr/PEP meter: £85. G3WIF. (Bristol) 0272 293738.

● B13, STC, new with 2 ceramic holders: £25. TT21's: £6. 6KD6's: £4. New ceramic holders for Eimac 4-125, 4-250, 4-400: £5. 2x 4-250's, equals 6156 Cond. unknown: £86. AR240 2m h/held 800ch digital VGC: £100. G3WIF. (Bristol) 0272 293738.

● SPECTRUM 48k, complete, boxed, insts, dem cassette, SSTV, RTTY, morse, programs, some games, joystick interface, constant level amp, exc. cond: £60. Plus carr. If required ideal cassette/recorder, well used. Free. G4CGT QTHR. 0254 705037.

● 1155 rotary PSUs. BC348 Command RX, TX, modulator, control boxes, ant relay meter. Collins TC512 RX/TX, Spectrum 128, Opus disk drive. Brother M1009 printer, all unused. BBC Micro with disk drive. Sinclair QL computer. (St. Albans) 0727 39333.

● YAESU FT726R tribander. 2m/70cm/6m all-mode. Semitel 100 2m linear. Yaesu MD1 desk mic. 3ele 6m beam. 8ele 2m crossed yagi. 8ele 70cm crossed yagi. Whole outfit only: £750. G4WLL. (Rhyll) 0745 334668.

● FT580 80-10m TX/RX 500W: £170. FT747GX mint, 6mths old: £495. Trio TS830S mint, fitted

YK88 CW filter: £695. FT501, digital HF, 80-10m TX/RX, 500W new PAs: £240. 0843 294446.

● RSGB RC14 beginners rcvr VY FB: £45. Howes SWB30 combined dummy load, attenuator, swr and pwr indicator module with moving coil meter: £25. Howes ASL5 ext audio filter for AM/FM/SSB/CW: £30. G0KJN QTHR. 0438 362795.

● TRIO TS530SP c/w desk mic plus KW600 linear. Both items in exc. cond. No split: £1000. 2 x 16k Spectrum computers: £40 pair. Stuart MacDuff GM0CAQ 0261 33298.

● FT290R Mk2, MTW100E dual band, FT209RH, all with accs etc. Altai dip meter, memory keyer, 10m 40ch tcvr. Offers for lot or will split. G4UXG QTHR. 0734 734263 eve.

● FT690R Mk1: £220. Spectrum TA651 6m amp and RPSS preamp, boxed: £40. Spectrum RC6-2, boxed: £18. MMT1296-144: £90. LMW linear 23cm 1W in, 3W out: £20. Boxed Tonna 50MHz 5ele: £25. Datong RF compressor PCB, boxed: £18. G8FAK QTHR. (Bedford) 0234 751475.

● VERSATOWER 40ft leanover tower: £420. QTHR. 01-907 6913 or 0227 794148.

● FT208, hand mike and base charger, Pye PFX 2m and 70cms synthesized handhelds £120 each. Phone (Milton Keynes) 0908 665705 weekends only.

● EPROMS Used and erased. 2764: 75p. 27128: 135p. 27526: 185p. 27512: 325p. Post £1 any quantity. State 12.5V or 21V. CWO. G1BNE QTHR. (Luton) 0582 33885.

● YAESU FT101 160-10m with additional 30/12m bands and D/B mixer, G3LL. Matching spkr hand mic. Good order and appearance: £250. Yaesu digital display YC601: £50. Yaesu monitor scope YQ100: £100. SEM Europa C 2m tvtr for FT101: £60. Pair new FT101 PA valves 6J56C: £15. FT101 service manual: £10. ST5 RTTY TU with leads and G4BMK s/ware for VIC20: £25. Dragon 32 computer, boxed, as new: £35. New Ferguson data recorder: £15. Heathkit Q multiplier QPM1: £10. G0GHX QTHR. 0202 880194.

● 2M station. FT290 Mutek F/E, nicads and chrg. Mint cond. 30W Alinco linear amp. Never used. Diamond DP322 vert ant, magmount and coax: £300. Derek, G0JHT QTHR. (Ruislip) 0895 635991.

● KENWOOD TS680S as new, under Lowe guarantee: £785. Kenwood VFO30G: £45. Codar AT5 TX with 250S PSU and T28 RX: £45. Scarab MPTU1 terminal unit with CBM64 RTTY program cassette: £45. 0242 528431.

● BATTERY packs Yuasa 6V 2.6ah: £2.50ea. Icom BP22 micro hand portable battery 8.4V 270mah: £20. Post extra or buyer collect. G1NOL. (Bishops Cleeve) 0279 506996 after 6pm.

● TS830S boxed: £675. FT101ZD Mk3, mic, lan, FM/WARC/CW filter plus new driver and PA valves recently fitted. FC902 ATU and SP901: £625. FT208R inc NC8A and every acc: £200. All exc. cond. Paul. 0926 429719 eve-w/e.

● 432MHz tvtr MMT432/144R 10W in 10W out. Ant attenuator, recently checked by Microwave Modules, works good as new: £80.00. Ian, G1HLT QTHR. (Mansfield) 0623 25651.

● HF linear AM/FM/SSB/CW. Mains powered 10W in, 200W out. Brand new: £120. Cybernet 3000 converted 10m FM: £40. G4WYF QTHR. 0253 56811 after 6pm.

● BENCHER single paddle. MFJ 901B ATU: £45ea. Both brand new, in their boxes plus £1 post. G2BGG QTHR. 051-422 1903 after 7pm.

● 10W PSU, 9ele crossed tonna, 5/8 whip, gutter mount. HB9CV, portable beam, Daiwa ant switch vswr meter: £20 the lot. Buyer collects. G6CAJ QTHR. (Clacton-on-Sea) 0255 812170.

● YAESU FT290R, boxed with m/mount, carrying strap, soft case, owners manual. VGC. Also Mutek F/E, not fitted. £250. No offers. G0HNB. (Surrey) 0737 762923.

● SUMMER clearout. MM 4m tvtr 10m IF: £60. Motorola MX340 h/held: £40. Scarab RTTY terminal: £35. Techsoft RTTY/CW program for

BBC-B c/w TFI interface: £25. Tandy MOD100 portable computer. Ideal for packet: £120. Epson portable modem: £75. WS2000 modem: £25. Centronics printer, suit BBC-B or PC: £75. Amber PC monitor: £40. MFJ1270 TNC2 clone fitted Pac-Corn 1.6PMS: £80. Portable 16ele 2BCX beam: £35. Katsumi CW keyer: £30. 27256-20 Eproms: £2.25. Open to offers. Julian G6LOH. 0327 857766. Fax 0327 857133. E-mail 72:Mag10951.

● YAESU FRG7 gen. cov rcvr. Good cond with h/book: £100.00. (Romsey) 0794 40793 7-10pm.

● KENWOOD R2000 comm rcvr 150kHz-30MHz VHF. 118-174MHz cvtr fitted. Mint cond c/w HF5 vert ant: £425. Stolle rotator: £25. G6RLH QTHR. 0322 523668.

● PYE UHF Europa: £50. UHF Olympic: £50. UHF Boot Westminister: £40. UHF Motorola CD100 dash mount: £60. Trio 7500 2m mobile, boxed: £150. Trio S700G, 2m multimode: £300. Pye F460T talkthrough base, duplex, manual: £65. Duncan G8KNF. 0908 564820 eve.

● NEVADA 2kW ATU, brand new: £135. Kenwood MC50 mic: £40. G3NXQ QTHR. 0905 20264.

● YAESU FT101E with CW filter. Superb cond. Prefer buyer inspects/collects: £300. GM3WRN QTHR. 0224 825513.

● ICOM 730 PS15, PSU, HM7 mic, CW filter, plus options. Mint. DX302 gen. cov 10Hz-30MHz triple conversion, ideal for SWL: £165. Rascal TA940B 100W solid state linear PSU: £135. G4LW. 0225 753166.

● FT102 tcvr. FM/AM board, filters. AT230 ATU. R600 rcvr. All in mint cond with manuals. Steve G0FLN. (Billericay) 0277 651313.

● TYPE D wavemeter with service book. No PSU: £5. Pair 6146B valves, never used: £12. Manuals, Wireless Servicing RCA Hobby Circuits RCA Transmitting Tubes Brimar valve Mullard valve. £1ea. All items post extra. 0333 50768.

● STORNO 500 portable on 70.425MHz. £30. Burndept 70cm portable fitted RB4 and RB6, toneburst: £30. Tuscan S100 computer. 2x 51/4in disk drives, software: £50. Many other items. SAE list. Chapman, 6 Pickhurst Green, Bromley. BR7 7QT. 01-462 2178 after 6pm.

● FRG7 time step digital SSB filter, h/book. Orig. box: £135. G3LIV RTTY/CW tuning unit with lead for BBC with G3WHO RTTY/CW Eprom for BBC: £40.00. 3-band vert 10/15/20m: £35. G3BDK QTHR. (Towcester) 0327 52309.

● YAESU FT221R 2m multimode base station. Orig. packing. Fitted DJ7VY preamp and 10 fixed xials plus full VFO. With SEM 40W linear, mic, mains lead, manual: £275. Carr. paid. Also DNT 29FM, £30 inc post. Write to Sean, G4MPCQ QTHR.

● HAM IV/CO4511 control unit. Brand new, unused: £100. G3LTZ QTHR. 0793 762559 anytime.

● TRIO TS430S all-band all-mode tcvr. All options fitted, plus RX 0-30MHz, TX 1.6-30MHz FM. Wide narrow filter mod. Exc. cond: £745. Yaesu FTV107R, 50MHz and 144MHz modules fitted, wired and working with TS430: £325. Yaesu FT290R nicads, case, unmarked, as new: £265. FT790R as 290: £295. MM144P 30W amp: £55. MM432P 30W amp: £65. MM432 100W amp: £85. 4 top TVT 435 TX: £135. TVG RX: £30. AR88 rcvr, VGC: £75. KW Vanguard transmitter works OK: £55. KW1000 HF amp: £315. Lots of other goodies and some junk too numerous to mention. All open to reasonable offers. QRT for now. G4TKP QTHR. (Derby) 0332 383442.

● GOING QRT. FT102 line up plus MD1 mic, phones. LP filter, DL1000, FAS14R, auto ant selector. 2 electronic keyers, Bencher paddle, BC221. Spectrum comp with RTTY/swr/pwr and mod meter. 2 Capco loopants. Daiwa cross ant needle ATU. Many more small items too numerous to mention. Come with: £1700 cash and a van and will get the bargain of a lifetime

or phone for prices. G4WBJ not QTHR. 0204 78231.

● **ROBOT 1200C.** BBC-B control/imaging processing s/ware, interface by G3NOX: £90. Yaesu YD148 base mic, new, for 480/780 etc: £25. Akter twin cased switchable 40/80 d/sided drives, PSU for BBC-B, perfect: £135. Paul, G4XHF QTHR. 0293 515201.

● **TRIO 811E** 70cm multimode tcvr. Good cond. boxed. I can deliver to nearby areas: £650. G6CQC QTHR. (Lanchester) 0207 529806 after 6pm.

● **YAESU FT270RH** 30W mobile FM: £220. Microwave Modules MM4001 RTTY tcvr, inc computer quality cased keyboard: £150. Both items in mint cond. with manuals etc. G4MDZX QTHR. 0360 312861 eve-w/e.

● **YAESU FL50B, FR50B HF rig.** VGC c/w mic, leads, manuals, spare PA valves: £150. G4LUC. 0928 714843.

● **FTV107R** tvtr and 6m, VGC. Sale due to lack of time to use: £140. G0KIO not QTHR. Write Pedmore, Church Lane, Ellastone, Derbyshire, DE6 2HB.

● **10M Union** 2830 USB/LSB/FM/AM/CW. 20W O/P. Cond as new: £250. Xtal filter, IQD, 8-pole for SSB, bandwidth 2.4kHz: £20. G4BWW. (Southport) 0704 29036.

● **EDDYSTONE 740 RX.** Can be seen working: £50. Generous wife equals purchase of new RX! 0752 847278 after 6pm.

● **2200GZ** part xtal'd VFO30G Modular Electronics 15-2PA with preamp. GWO: £150 lot. MMT144/28 10W, as new: £200. All manuals. Blower by ACI, VBMS 97CFM free air 4MFD cap req'd: £10. G4GBH QTHR. 0543 263919.

● **BEARCAT 50XL** scanner, 66/88, 136/174, 406/512, nicads, chgr, aerial. VG performance. Brand new, boxed, unwanted gift: £70. G4JHKV QTHR. 0481 47278 8-6pm.

● **YAESU FT774GX** with extras: £550. Yaesu FT290R with extras: £270. Yaesu SP767: £50. Yaesu FT2F: £50. Drae 24A PSU: £90. Yaesu FC707 ATU, Ezilune: £100. Other gear for sale also. Pete, 23 Chestnut Walk, Bishopsworth, Bristol, BS13 7RJ.

● **TEN-TEC** Triunx 22 with fitted electronic keyer and suitable PSU with circuit breaker: £260. Kent double paddle key c/w matching electronic keyer: £45. Tom, G4LDI QTHR. 0709 874100.

● **FT726** with 430MHz, 144MHz and satellite units. Hardly used as can be seen from logbook. Marriage forces sale, honest!: £750. G6UDM QTHR. (Wolverhampton) 0902 783338.

● **ICOM R71E HF rcvr,** boxed, mint cond: £500 or exch for HF tcvr Icom 740 Ray. G7BHC QTHR. (Suffolk) 098681 582.

● **TRIO DFC230** freq controller: £45. Trio dip meter with xtal osc. function, inductance measure AWM parasitic harmonic tracer: £60. Boxed, unused candlestick vintage WW2 mic. Rare item. Fully restored. Offers. FT1012 MK3 with FC902 ATU used on RX only. Mint, manuals, boxed: £565. Trio HC10 world clock, manual, boxed, mint: £50. Minolta miniature spy camera circa 1948. Perfect, films available 16mm flash unit, close up lens case: £30. Rare. Allan G3GXR. (Standish, nr Wigan, Lancs) 0257 422766.

● **MULTIMETERS.** GEC, Taylor, Avol: £35. Fluke model 73, Digital 10m input, auto ranging. Offers. Vintage candlestick mic WW2. Offers. All mint cond. Heathkit LCR bridge: £50. FT1012D. FC902 ATU: £565. Boxed. Sensible offers. Allan, G3GXR not QTHR. (Standish) 0257 422766.

● **SONY ICF7600D** portable comm rcvr, 153kHz-29.995MHz plus 76MHz-108MHz c/w mains PSU, carrying case and manual: £950. G8WWD QTHR. 0527 402557.

● **YAESU FT1012D Mk2:** £350. Trio 7730 2m FM tcvr with mic: £145. Era Microreader with PSU: £75. Or reasonable offers. All professionally checked in good order. Sale due to Silent Key. (Wigan) 0942 44444 9-10am w/day 0257 424469 after 7pm.

● **KW500** linear amp. Ant relay fitted and restored, almost like new: £200.00. Matched pair QY4400, not new, guaranteed tested. GWO. Offers. New lightweight Halda 1hp petrol engine, suitable mobile generator: £65. G0GGI QTHR. (Cumbria) 0229 89635 anytime.

● **MICROWAVE** Modules Meltoscat cvtr 137.5MHz unit. Good cond: £40. Also MM Meltoscat gaslet preamp suitable for masthead mounting. Good cond: £30. Tim, G4WFT QTHR. 0933 313150 after 6pm.

● **NIKON 301** camera. New at Xmas, cost £280 with zoom and case. Will exch for HF radio rcvr or sell for: £170. G4WGR. 061-320 8941.

● **REDIFON** RA08 RX VLF 28MHz variable selectivity. Lovely RX. ARBBLF RCA RX: £50. CD660 RTTY/CW/ASCII/AMTOR decoder. As new: £180. Drake SSR1 RA: £85. 0834 3057.

● **SUPPORT 4m activity.** 144/70MHz MM tvtr c/w 15dB attenuator 1W in 10W out: £145. 70MHz MM linear 10W in 40W out. Recent MM overhaul: £85. Collect or carr at cost. G3ADZ QTHR. (Rugby) 0788 815222.

● **WRASSE SC422 SSV tvtr.** 3mem for colour: £350. Would swap to FT620 or WHY? G8ASI QTHR. 09277 65734.

● **TOKYO Hy-power 2m linear amp** ali-mode 1-12W in 10-85W out: £85. As new. Matched pair 6KD6 valves, unused: £12. G4WBU QTHR. (Swansea) 0792 773719.

● **ICOM AT500.** Automatic aerial tuning unit. Mint, boxed with inst, accs. Fully automatic and is compatible with most other commercial equipment. Power capability 1kW PEP. Tune-up 3sec. List price £510. Sale: £300. No offers please. G2FZU QTHR. (Southwell, Notts) 0636 813847.

● **FT726R** 2m/70cm/6m satellite board. HF module. MH18B mic. All absolutely mint, boxed, practically unused. Complete VHF/UHF/HF base station. New from SMC last year. Cost £1495. Sale: £1100. No splits considered, except HF module: £180. G2FZU QTHR. (Southwell, Notts) 0636 813847.

● **ICOM 04E** 430/440MHz FM tcvr, h/held. Absolutely mint as supplied. Used few times only as base station. C/w all inst/accs. 10m high/low outputs. Max 5W. Surplus to needs, list £299 inc battery pack. Sale: £195. No offers. G2FZU QTHR. (Southwell) 0636 813847.

● **SCOPE.** Hameg HM207/3 single beam, 8MHz bandwidth c/w manual: £75. Trio SP520 extension spkr: £25. Tronix-1 13.8V 7A PSU: £20. Fax weather facsimile decoder covers RTTY and Navtex: £225. Tech 22D audio generator 15Hz-200kHz: £15. G3RDC. 01-455 8831.

● **TRIO dual-band** mobile radio for sale, 2/70. TW4000, exc. cond, very good results received plus Weltz Diamond NR72M whip aerial for 70. Used once: £275 the lot but will split. G0JYI QTHR. 0702 77601.

● **G2CAF RX** and TX c/w 2m tvtr plus separate PSU. Cash offers or swap for 2m SSB tcvr, need the space. G8XJU QTHR. (Warwick) 0926 832877.

● **YAESU FT225RD** memory unit, Mutek F/E: £495. FTV901R tvtr fitted 2 and 4m: £250. FTV107R tvtr fitted 6m: £125. G4SEU QTHR. 0203 392503 eve.

● **KENWOOD TS930S, MC60, SP930, CW filter,** YK88CI. Exc. cond. Offers around: £1100. G3BJD QTHR. (Cumbria) 0946 810047.

● **HY-GAIN 18AVT/WBA** HF vert ant c/w inst. manual. Good cond: £80. G6SX QTHR. (Southport) 0704 67436.

● **BBC-B** with 40T DS disk drive, data cassette recorder, Watford Adder prom programmer, colour monitor in wooden case plus s/ware. Bargain: £350 the lot. No split. Electronic developments 100W 2m linear: £85. Daiwa SR9 RX fully xtal'd plus hb PSU: £40. 2 Texas silent 700 terminal/printers, may need print head hence: £20. Buyer inspects and collects or pays carr. G0DLF. 0604 831061.

● **DAIWA MR750PE** rotor with 4 motors, hardly used: £275. 50ft slimline square section telescopic tower, c/w bolt-down baseplate and tilt/over facility. Inc rotor mount, thrust bearing winches etc. Buyer inspects and collects. Peter, G4HBS QTHR. 0642 816508 after 7pm.

● **YAESU FT23R** 2m h/held: £160. Trio TR3500 70cm h/held with mains chgr ST2: £170. Trio TR2400 2m h/held with mains base chgr: £125. Yaesu FT211RH 2m FM high power mobile tcvr: £200. All plus carr. G8EBM. Leamington, Burford-Green Ln, Weston Underwood, DE6 4PF. (Ashbourne) 0335 60755.

● **ONE Kenwood R1000** rcvr. VGC: £200. Philips D2935 rcvr: £130. Wood. (Clochan) 05427 378.

● **ICOM IC751** tcvr SSB/CW/AM/FM. PS15 PSU fitted fan. Filters FL32, FL52A and speech synthesiser. Total: £360. Icom ICSM6 desk mic. Owners manual, w/shop manual. Perfect order: £1100.00. G3RDC QTHR. 01-455 8831.

● **PHILIPS** green screen as new. Cost £95. Any offers? SWL. 0225 465557.

● **RACAL RA17L** in good cond and exc working order: £200.00. 0536 744815 anytime.

● **KW M40** 10m tcvr, 40cm mains or 12/14V with 25W amp. Manual and mic. As new: £45. Hi-mound BK100 mech bug: £15. Hi-mound twin paddle all-bug marble base: £15. All post paid. G5LH QTHR. 091-268 2490.

● **SOMMERKAMP FT290R** Mutek F/E. Listen on I/P. Nicads, chgr, carrying case. Rig badly scratched metal. Reflects price at: £235. Will deliver if you pay petrol or post, packing and insurance extra. Joe. 0625 20635 anytime before 9.30pm.

● **TRIO TR9130** 2m multimode, boxed all accs: £320. Trio TR8400 70cm FM tcvr: £140. Datong

PC1 cvtr: £45. Datong AD370 ant: £20. MTV7000 rotor: £25. SA450 VHF switch: £5. ATU SJJames Mk2: £12. Phihong PSU 13.8V/7A: £20. Vernon, G6ORW QTHR. 061-764 3890.

● **ROBOT 400** slow scan TV cvtr picture held in memory for display on standard fast scan monitor. Perfect cond: £290. G2HCG QTHR. 0425 617090.

● **TRIO 751E** 2m multimode, new Feb 89. Hardly used. Mint cond. with packaging suitable for base station. Separate PSU required. Buyer inspects, collects: £475 cash on. £599 new. G4SIB QTHR. (Newdigate, nr Gatwick Airport) 030677 362.

● **ICOM IC260E,** boxed, complete: £225. W20AM/FM, P-band: £15. HP1FM, MF5AM, A-band: £10ea. AEL3030, HF/SSB, 100W, 12/240V: £70. R1224A: £20. Coutant 12V/20A PSU, new: £50. 30ft lattice tower: £65. Larkspur A43 walers, A41 ancillaries. SAE list. G4NCE QTHR. 021-357 6139.

● **TRIO R2000** boxed as new, used less than 10 times: £400. Just bought tcvr so it must go. G1XOK QTHR. 0403 731358.

● **MICROWAVE** Modules MMS1. The ultimate Morse talker. Got me my Class A licence no problem. It's your turn: £50.00. G1XOK QTHR. 0403 731358.

● **SOMMERKAMP FT767DX** (FT707) 100W mobile HF trx, recently overhauled and fitted with Spectrum Comm FM system by Amcom, Datong auto speech processor. All on rubber mounted cradle. G-whip tribander helical 10-20m plus 40 and 80m coils, fitted on roof rack so no mounting problems, and Heatherlite mobile mic to round off an ideal mobile HF outfit, all in GWO and VGC. Mobile dem given to prospective buyer 60 miles London. G0ANC/M. 01-427 6097 day.

● **YAESU FC707 ATU,** boxed as new: £75. John. 01-857 8096 after 11am.

● **THE Book of Practical Radio,** John Scott-Taggart, published 1934. Radio Servicing Simplified, published Avo 1935. Brochure, The Avometer, August 1935. Brochure, The Universal Avometer, 1935. Offers invited for any or all. Richard RS22453. (Somerset) 0823 256057.

● **KENWOOD TS440S** with automatic ant tuner built-in, 5mths old, c/w multi-band vert mobile ant for 10/15/20/40/80m. Sale at: £870. Leave number on 0865 544333 day 0865 52615 after 7.30pm.

● **JAYBEAM TB3** tribander: £200.00. Buyer collects Westminster. Phillip G6IMM. 01-698 4437.

● **TH3** hygain beam 3mths old, as new: £175. Kenwood TS930S, as new, boxed: £550. G4WTF QTHR. (Swansea) 0792 403526.

● **SONY CT beta** video for spares. John. 01-857 8096 after 11am.

● **YAESU FT208R** and FT708R h/held c/w desk top chgr, spare batt and hand mic: £275. Complete or will split. G6TLB. 0909 474743.

● **KATSUMI** EK150 combined key and keyer, mains or 12V operation. Iambic or semi auto, built-in monitor, transistor or relay switching. Good cond: £75.00. Chris G0LYZ. (Derby) 0332 701247.

● **ICOM IC740** with PS15 PSU: £595. Datong Morse tutor: £30. Fritzl 5-band vert HF-ant: £35. AR30 rotor: £35. MM2 Morse talker with PSU: £80. Gutter mount 5/8 mobile ant: £15. Yaesu FT207 h/held 2m: £80. Ron, G3JTO QTHR. 0425 277767.

● **YAESU FT790** nicads, chgr, softcase, manual: £275. 70cm linear 20W Tokyo HL20U: £40. Wood and Douglas 70cm linear 1W in 10W out: £15. Tonna 19 crossed ele: £20. 2m 7ele crossed: £10. G1AVU QTHR. 058285 3598.

● **SPECTRUM** computer 48/128k fitted interface one RS232 TNC lead, cassette recorder, 3 tapes, logbook computer, TNC proc. ZX microdrive with cartridges, Alphacom 32 printer with 5 spare rolls paper, 8056 serial printer with thermal paper rampprint. Centronics interface with ribbon cable. Connecting cables and user manuals for all items. The whole package: £200 or would consider selling items separately. Prefer buyer collects if poss. G4BAL QTHR. 01-302 4062 up to 7.30pm.

● **ALING ALR22E** 2m FM 25W mobile. Hardly used, boxed: £185. 0452 505703 eve.

● **STANDARD** C7800 70cm FM mobile. Mint cond: £170.00. G3YNC QTHR. 0708 49175.

● **ICOM IC32E** h/held dual-band: £300. Sony ICF7600DS: £100.00. John Jones. 0203 257490 or 01-836 2201.

● **ROBOT 400** SSV tvtr, mint: £260 cash or swap for 290R mint with chgr etc. Prefer buyer collects. Also FRG7700 RX: £200. AOR 2m rig, h/held 1W FM: £80. G4EYD QTHR. 021-478 2429.

● **AMIGA** A500 1MB RAM, latest O/S, many books, disks: £500. Second disk drive: £80.

Amiga 1081 screen: £180. FT221R, fitted Mutek F/E: £300. FT775, fitted narrow filter and marker: £300. All exc. cond. G4ZHY QTHR. (Coventry) 0203 457834.

● **FRG8800** gen. cov rcvr inc VHF cvtr. Exc. cond, orig. packing. A bargain at: £450. £300 below current new price. BNOS 144MHz 160W linear, 20/25W drive. Boxed, hardly ever used: £210. G4XNS QTHR. (Preston) 0772 612910.

● **KENWOOD TS670** quadbander 7/21/28/50MHz G.C.RX voice synthesiser. All modes. Dual VFO's 80mhz 10W out 12V working: £800.00. Ten-Tec ATU model 227: £450.00. Katsumi electronic keyer EK108A. Offers. TX/RX valves. SAE list. G3GBH QTHR. (Inkberrow) 0386 792582.

● **MARCONI** UHF wavemeter TF643A, test set No.4. Cossor sig. gen 5-50MHz, type 52A. TR1196. Other WW2 items. Offers. G3LGD QTHR. 0234 720241.

● **LOWE** HF125 gen cov rcvr serial 74001 with user manual and maker's regulated supply. Operating properly but never in general use. Will deliver or send by carrier in orig. box and packing: £275 or best offer. Davey., G3BZD QTHR. 0752 847930.

● **KENWOOD** VHF h/held tcvr TH215E. Chgr and spkr mic: £200. Kenwood TS520, 5-band TX. Good cond. New PA valves: £300.00. G4GHG QTHR. (Torquay) 0803 37050.

● **CUSHCRAFT** 10-3CD 3ele 10m monobander: £100. Hygain 105BA Sele 10m monobander: £150. Both as new. Sale due to QTH change. Also Jaybeam Sele 2m: £10. 12ele 70cm yagi: £10. Hi-gain 12AVQ vert: £20. G3ZJX QTHR. 01-650 2899.

● **DEVIATION** meter, Dymar 1785 AM/FM 30/240MHz: £60. Scope, Advance 05250 d/b: £100. Prestel TV, STC Novatel: £25. RS232 IEEE488 interface, SSEL-B: £30. G-whip coils various: £3ea. Full serial keyboard, GEC: £10. Video SPG, National WV611N: £10. G8AYN. (Lutterworth) 0455 557790.

● **FT902DM** boxed as new. Very little used: £525. G4MH minibeam and CDE AR40 rotor and controller: £125. Will split. Graham, G4JJC QTHR. 0274 674462.

● **6M RN** electronic tvtr FM, F, mint, 25W out: £135 or exch H/H 2m. FTV901R tvtr and 2m module, mint: £180. 2m 9ele yagi beam: £12. DA Williams, 4 Chapter Rd, Darwen, Lancs, BB3 3PU.

● **YAESU FT290R** Mk2 in good cond, boxed along with all usual extras plus PSU and Yaesu desk mic: £290.00. G1EMJ QTHR. 0902 771909.

● **SHACK** clearout. 4X250B, 4CX250B, 9X2 Eimac bases and chimneys: £25. Switchmode PSU 5V at 5A 12V at 1A: £10. Books, practical ant's, ARRL ant h/book 14th ed, VHF/UHF manual: £12. 15 assorted voltage regulators: £10. Les, G4DBX QTHR. 0270 71369.

● **ICOM** 2900 2m all-mode 25W. Exc. cond. Recent Icom UK check-up: £380 or ptxch MFJ ATU. 09952 5580.

● **PAIR** Eimac 4CX250B as new, c/w SK620A bases and SK638 chimney/anode clips: £100. No splits. Some RF PA transistors and prescalers. SAE list. G4CXT QTHR. 0473 610073 after 8pm.

● **HEATHKIT** DX400, VFO and spare valves: £35. Top-band AM/CW valve TX with PSU: £10. Airmec vpr oscillator type 304 50kHz-100MHz: £20. Buyer collects. G4CXT QTHR. 0473 610073 after 8pm.

● **RCA** B/W camera, Sony zoom lens: £175. Wrasse SCH22 with colour board: £300. Wrasse SC1, keyboard, line sequential digitiser: £700. MM144/200S 200W linear: £250. PK232 and Amstrad 6128, colour monitor c/w interface and prog to operate: £500. Will split. 0524 51896.

● **STANDARD** C7800, Trio TR2300, Trio TR3200, Casio PB110 personal computer, all mint cond, any reasonable offers secures. G3YNC QTHR. (Romford) 0708 49175.

● **SHACK** surplus. 4m h/held MX45SS from Lowe. Perfect. 70. Heath HD1250 GDO, cased: £55. Heath IM17 solid state v/meter. Cased: £20. Sharp cass. rec.: £15. Datong RFA: £15. Avol: £20. Modern meters. 1mA 199mA 500uA 100uA 2A. Many var c/rc 2/3 gang. Mech filters. Icom, Kokosai, Collins. Eddy 2x30p TX cap. 2x5in coil stock 15TDI 2in dia. 10x20/25/45/120p 10kV, fixed. Eddy 120deg. BC221 no mods. Orig. charts: £20. 4m rcvr variable 125/150V: £15. Valve voltmeter PSU range 5-range 2.5/30V: £15. Heath rcvr PSU 0-400V 12/6V bias 0-150. Twin meter: £25. PSU for Vespa G.Cabinet: £20. PSU 12V 250mA meter: £8. PSU 12V rcvr 3.4A lid. meter: £17. PSU 13.8V rcvr 10A lid meter: £40. Transformer 6.3V 2x5.7A 1x2A lid filled: £7. Sony Digimatic digits stopped. Radio OK. FM/AM: £7.50. PSU 27/12/9/5V: £12. Large ceramic 2P.5W switch £5.

WANTED

● Valves, many new. No duds. Typical KW Collins 5010t. £10. Radio control TX 2RX Digifleet Pro7. 24 servos. Engines 25/40/60 low mileage. Price about half. Tuned pipes. Scores of wheels. Wire bender. Varo wing jig, rare. Jackson 1/1.5 bevel knurled control. £4. All offers are good and wholesome. Nothing tatty. G3RHM QTHR. 01-423 2329.

● YAESU FL2100Z linear amp, hardly used: £550. No offers. G0GQD. 01-423 6159.

● STRUMECHEP60, post mounted, CDE rotator, Hy-gain TH3-JNR, winches, ST5C TU with PSU, cvtr was deleted. Hallicrafters SX122A comm rcvr, 10 valves little use - packet TX/RX Italian clone good 2m. 2m tvtr, offers. G4DEL QTHR. (Essex) 04024 51410.

● AR2001 scanner, 25-550m continuous cover. Modes NFM WFM and AM. Exc cond with orig box and accs: £2400. Or plus cash PX for HF TX/RX with GC RX. G0JBC QTHR. (Hull) 0422 59680.

● 60FT 3 section tower, 2 hand winches and a 5ft head unit. I need the space more than the money, therefore am open to offers around: £300. Buyer to inspect/collect. John GBEIZ. (Ascot/Berk) 0344 885246.

● EPSON 8148 intelligent serial interface with 8k buffer and X on/off for LX/RX/EX/EX/HI/LQ/SQ printers. Brand new, boxed, unused. Cost £90 new. £400. 0322 53953.

● GP144W 2m vert ant. £10. Jaybeam 2m 50e yagi. £10. Hi-mount MK706 squeeze key. £15. Oscar 2HE 2m mobile ant. £5. Mag mount. £5. Half size GSRV. £5. Arcturion with controller and cable. £15. G0ELH QTHR. (Basingstoke) 0256 473508.

● MAST, Allron Pigmy, upgradable rotator: £250. CommScope C64 D/D. £150. Dragon 32. ST5 TU. £60. Spectrum: £20. Printer MPS803 for C64. £90. Mic Adonis AM503G. £35. RS232 C64. £10. All good cond. Reasonable offers taken. Alan, G0EGX QTHR. (Tiptree) 0621 815978.

● BROTHER EP44 terminal printer. Ideal portable packet terminal inc roll paper feeder: £1500. Also Tandata TO11000 Prestel terminal for easy access to RSGB Databox and Prestel. £75. Andrew, G1HEA QTHR. 0274 721810 day 0535 610446 eve.

● TWO RT106 SSB PMRS with details of how to convert to 80m. I will not sell until advert appears in RadCom: £60ea. Not on phone so please write. G7BOD QTHR.

● FRDX400, FLDX500, both need attention hence: £1400. Apple II Europlus computer. Disk drive. Monitor. 128k RAM. £1600. ZX Spectrum 48k. Printer. £200. G3XHC QTHR. 08043 3621.

● TRIO R1000 rcvr. Exc cond with manual: £130. G2DZ QTHR. 0327 60530.

● FRG7700 rcvr, hardly used: £220. Solartron scope CD1400. £40. Roband PSU V50-20D, 0-500V 200mA. Best offer. HF5 vert with radials: £50. Katsumi elekey K121. £15. Jaybeam 60e quad 2m. £35. Never used outdoors. Yamaha Portasound MK100: £160. Never played. Pearl-corder SD2 cassette dictating machine, wireless mic, FM tuner, voice actuator: £30. Psion Organiser CM. 3 16k datapacks, finance pack, 68k datapack. Cost over £200. Only: £120. G4XXI not QTHR. (Epsom) 0737 373234.

● WESTMINSTER, boot mount, lone burst, preamp, S20, S22, S23, R2, R3, R5, R6, R7 fitted mic, control box, spkr. £550. PF2, lone burst RB6, RB10, SU20 fitted: £400. 051-256 9814.

● HYGAIN BN86 balun: £15. Technical Associates audio filter, 8 positions down to 80Hz: £15. CDE TR44 rotator in bits, needs new ballrace. Cage available. SMC inc assembly inst. £12. Buyers collect or pay post. GM3AWW QTHR. 041-639 2370.

● YAESU FV101DM digital memory VFO in mint cond: £100. Kenpro KR400 ant rotor. Good cond. £95. Les, G4DBX QTHR. 0270 71369.

● TRIO 9130 2m multimode. 5/25W, boxed, manual, bracket, mic. Limited use, VGC: £340. BBC-B issue 7 Vigen console. Dual drives. Mouse, Superat, Pagemaker, Wordwise, ATPL, ROM board, 16k swr: £400. G0WKM QTHR. 0758 740371.

● 70CM KR31W linear: £200. 2m 2x 4CX250 linear: £150. PSU for linears: £150. Advance PSU's 13.8V/10A: £20. 24V/5A: £12.50. 5V/60A S/M: £10. G4CRF not QTHR. 029671 4888.

● TE20D RF sig gen: £20. TA32JR beam. Buyer collects: £70. AR40 rotator plus 50yds cable, unused: £100. Tavas mobile whip for 10/20/160m: £10. Kenwood TS120V, mint, unused mobile: £290. G3VMY QTHR. 0734 663506 eve/w/e.

● ALINCO ALM203E 2m/marine h/veid rcvr 140-160 TX. Professionally converted 10cm

12.5kHz steps. Matching 30W amp. Mint cond. Boxed: £210. G3RUB QTHR. 0773 803005.

● QTH safe. Situated West Moors, Dorset. One third acre excellent attractive 3-bed bungalow, built 1960. Secluded gardens. Quiet cul-de-sac, near bus stop. 8 miles Bournemouth or Poole. Refitted kitchen and bathroom. 25x12ft garage w/shop and pit: £145,000. G3FK QTHR. 0202 873175.

● ICOM IC730 with service manual and box. Mint cond: £475. Jaybeam 4ele quad for 2m, new: £25. G6TIJ not QTHR. (Yeovil/Somerset) 0935 78812.

● RADIO and Television Servicing 1967-1976. Offers. Ferranti AC test set, 2 dials collectors. Dutch radio rotor RX: £10. Fantavox air-band cvtr: £5. Avo 8X case: £70. Many radio books, please enquire. Buyers collect or pay post. 0460 76143.

● YAESU FT707 SSB tvtr, manual: £300. YAESU FC707 ATU, manual: £75. YAESU FT227 RV VHF/FM transver, manual: £90. B/W TV: £15. PSU 13.5V Dae 24A: £100. Datong audio filter FL3: £100. ATU Kenwood 81/120: £60. Evans G3VGO. (Truro) 0872 864255.

● STOLLE rotator plus control unit: £20. AKD WA1 VHF wavemeter, new: £15. FR77700 ATU: £25. 2 Eddystone ceramic s/plated spiral stator caps type 831, new: £20. 2 KWV. HA White, 13 Roundwood Rd, Welwyn Gdn City, AL8 7JZ.

● ICOM 751 c/w AT100 auto ATU. Both tvtr and ATU. Superb cond. Can be seen working: £900. G1FEJ QTHR. 01-394 1165.

● YAESU FT790R UHF multimode portable c/w case and nicads: £2350. NEC PC8201A CMOS portable computer, LCD display, 64k RAM, cassette, RS232, parallel ports, built-in Basic, Comms, WP packages: £165. G8VOI QTHR. 0705 250630 after 6pm.

● FREQUENCY counter 4 digit 5MHz with 150MHz prescaler: £35. G4LRT QTHR. (Northampton) 0604 740633.

● SCANNER UHF/VHF 25/620MHz 760/1300MHz includes Cellnet updated 400mhz which are scanned in 25secs. AC/DC 240/12V int PSU. Latest Japanese import ascu, service manual, aerial inc. £250. Box valves with very rare KW2000 6CH6. £5 Bruce. (Bristol) 0272 500742.

● AOR AR2002 scanner rcvr and Aircastle interface plus books Scanners and Scanners 2: £450. Daiwa PS120M variable PSU: £490. Converter Harrier 10m FM: £450. Taylor GOAKN (Twickenham) 01-891 2820 eve.

● FTONE YAESU. £950. FL200B linear amp: £360. Tono MR150W 2m linear amp: £100. Multi 700EX 2m FM: £120. Tau SPC ATU: £175. GP432X 70cm coilinear: £23. All in pristine cond. No offers. Details: Tony, G4VTC QTHR. 0306 885533.

● TRIO TM201A 2m FM mobile. 25/5W with m/ bracket, list mic, Heatherlie mobile mic, box and inst. £2750. YAESU FT203R, 2m FM h/veid 2.5/0.3W with case, nicad pack, chrg, batt case, rubber duck. Boxed inst: £1650. YAESU FT708R 70cm FM h/veid, 1/0.1W with case, nicad pack, chrg, list spkr, rubber duck. Boxed, inst: £1750. All in immaculate or very near cond. Buyers to inspect and collect. No system splits. Mike, G1HGD QTHR. 0926 513073 eve.

● FT101ZD WARC fitted with FM board plus matching FV101DM digital memory VFO: £530. Tokyo hi-power ATU fitted with int noise bridge plus upgraded dummy load: £150. All exc cond. c/w with orig packing and manuals. G4L TM QTHR. 061-338 3787.

● ICOM IC1200E 23cm mobile: £300.0vno. Lee G6KBA. 01-358 9868.

● ICOM 251E 2m multimode basestation tvtr fitted Mutek in exc cond. Boxed, h/book plus Mutek sheets. Recent service by Icom: £435. John, 01-857 8096 after 11am.

● TRIO 9130 10/25W 2m multimode tvtr. In perfect working order. Any demo at my QTH. Mobile mount, memory backup adaptor. New 5/8 whip. All inst with orig box. 6yrs RadComs with sale: £3400. G6ZSQ QTHR. (Mansfield) 0623 511021.

● TRIO station monitor SM220: £230. Hansen auto swr/pwr meter: £70. Heathkit linear amp SB200: £250. Trio R2000 rcvr, faulty: £380. Telescopic BP40, 40ft Strumchee tube, 8mths old: £500. HF steel 8-leg quad base, spider, 22lbs: £10. Drum 100m URM67 50ohm cable: £50. RadComs 1979-1998, offers. Short Wave Mag 1978-1986, offers. 7ele TH7DX beam, never used: £500. Knight KG686 RF generator 100k-54MHz: £25. Weststone GNT transmitter model 112/2042. Creed tape punch machine, typewriter and GPO hand punch. Offers. Gecco-phone No.1 xtal set. Offers. Heathkit valve voltmeter, faulty: £5. Late G5CS equip. G1IU. 01-398 3663.

● COWL Gill motor, Rotax C1306 or similar, GW3IFV QTHR. 0239 614487.

● HQ1 minibeam in good cond. required at a reasonable price. Douglas, G0IQG QTHR. 01-574 7694.

● FOR R1475, mounts type 656 and 657. Also user insts for Philips tape recorder N4511 and complete remote control N6719. Also Revex 877 reel-to-reel recorder. Derek Sheen G4CCW. 01-651 1410.

● BOOKS for African student "Electronic Devices and Circuits" Bogart Telecommunication Technician 732655.

● STAR Master electronic memory keyer. Bench timer paddle key Tony, G4KHT QTHR. 0482 223141x4657 day 0482 843457 after 6pm.

● WODEN mains transformer type SRS/152/T wanted. 240V primary. 670-0-670 secondary with taps and various L/T windings. Reasonable price offered. Will arrange collection or pay carr extra. Denis Jones, G3UVR QTHR. 051-652 7454 day 051-342 7880 eve.

● KW160 TX wanted by old timer. Also Digi Ireq meter, GM0KMG. 041-649 4345.

● EMOTATOR model 103LBX. Borrow, buy, photocopy h/book. YAESU tuning unit FC102. G3AAE QTHR. 01-308 3669.

● HELP Sugiyama 850 tvtr. Any and all info, circdiag, h/book, parts or copies etc or anyone who has knowledge of repair maintenance. All costs involved paid with a smile. John Hedges, G7ANQ QTHR. 0203 393852 after 5pm.

● BEARCAT 580YL or JIL SX200 scanner. Must be VGC in exch for Amstrad CPC 464 computer, colour monitor, VGC with cassette tapes, IVC Morse tutor tape. Ted, G1RGO QTHR. (Cannock) 05435 3064.

● FT767, FT101B/ERTTY reader 0843 294446.

● CERAMIC valve base for Eimac 4-65A. RF amplifier 0-2A. Plug-in TX coils for BC610. TUSB Heater xformer 6.3V CT at 8A. Relay suitable linear amp DPCO 12V DC. John G4VJK. 0293 783556 anytime.

● HELP! Can someone please tell me where VOX relay is situated in YAESU FT101E and how to gain access to it? Or would willingly pay anyone willing to undertake its replacement, preferably within 100 miles of Perth, Scotland. GM3GNM QTHR.

● TS830S preferably with remote VFO but not important. Must be in good cond. G3VOF QTHR. (Essex) 04023 73366.

● MICROPHONE unit complete for Swan Astro 150 TX/RX. G3HJG QTHR. 061-748 7585.

● MINI car, trailer and driver available for collection of Air Ministry mains PSU type 114, or type 115 with rotary generators series 32/35 required to restore to life my otherwise completed 115/54 installation. Larry, G0HTR QTHR. 0827 989024 anytime.

● CIRCUIT or any info on KW Valiant TX or Geloso VFO. Brian Hodgson, G3YKB QTHR. 0525 221665.

● COLLINS S-line, Drake RTA, TS780, G4LW 0225 753166.

● 100KHZ IF transformers. Also 6th or 7th edition of Radio Amateur Techniques by Pat Hawker. Has anyone CV valve list with equivalents they no longer want. 0353 720583.

● MORSE RTTY reader MBA, RO or RC. Must be in GWO. Preferably with h/book and circuit. Would consider similar self-contained unit. G1RHN. (Purley) 01-660 1326.

● RECRUITING 24 would-be club members (all British Radio Amateurs) to share in the enjoyment as well as the running costs of a radio amateur exotic tropical island beach villa. QTH c/w HF station to be shared at the rate of 2/52 per member annually. 0908 668169.

● MUTEK 144 TVVF 144A tvtr, 28/144MHz. G8JAY. 0242 578914.

● SERVICES Textbook of Radio Vols 2, 4 and 6. M.Foulds, 287 Knowsley Lane, Huyton, Liverpool, L36 8EL.

● FREQUENCY meter TS175, UHF version of BC221. Also manuals for TS174 and TS175. Has anyone got any data on the National NC200 RX? Ron Brown, G6WRP QTHR. 01-584 5000 x4620 day 01-855 2300 eve.

● KENWOOD ant tuner. AT230 with manual VGC. Will swap for FC902 in VGC to match my setup. GW0FHL. 0407 2330.

● WANTED for YAESU FT901DM, Curtis keyer plug-in assembly. Also DC/DC cvtr SP901P spkr unit. FC901 ant coupler. Also for Swan 100MX Vox PCB assembly. G3GDC QTHR. (Devon) 0752 403551.

● FOR nostalgia. Original software to run first ever AMTOR design, Amtor The Easy Way. G3PLX RadCom July 1980. Author and ICS cannot help. Prefer in orig 2708 Epsom else tape softy Transwilt or Spectrum format. G3ROZ QTHR. 0767 80828.

● REQUIRED: metal valve 6A8 USA origin, paintwork must be complete. Valve enthusiasts look in your boxes! Also needed: pair metal 6L6's wartime style. Bernard Litherland, G4IMT QTHR. 0225 891254.

● TOP band transistor rcvr in good cond. 01-486 4376.

● PANASONIC JD840U computer. Any data, particularly technical or s/ware required for this old, 8in disk, CP/M based machine, or its successor the JD850U. Info about CP/M not needed. Albert, G3MGL QTHR. (Crawley) 0293 20986 24hr ansaphone.

● Any info on the Collins VHF TX/RX type 618F1 airband. Any help appreciated. All copying costs met. Brian, GW4KYT not QTHR. 3 New Rd, Trebanos, Swansea, W.Glam. (Clydach) 0792 846014.

● WIRELESS set No.22, WS No.18 in reasonable cond, to add to collection of similar equip. Also, Pye B or C-band Westminster Motaphones, Olympics etc, and F30AM or similar basestation. May consider M-band equip. Can collect. WHF? G4NCE QTHR. 021-357 6139.

● HF linear amp commercial or Homebrew considered. Must be in full working order. G0IHB QTHR. 0565 893942.

● YAESU NC8 combined bench PSU and chrg for FT208R. G3THZ QTHR. 021-588 2767.

● HELP! Wanted remote VFO 820 and tvtr TV502 digital display DG1. Cash waiting to compliment my TS820. Also ext spkr SP520. Please write or phone QTHR. Clear those shelves off, G0AYZ QTHR. 0705 589560 or 0436 71047 not QTHR TXN.

● KW2000 plus PSU in good clean cond. Spare valves if available and manual. G2CLN QTHR. 0527 73578.

● KW2000B mains PSU. Not working considered. Also spkr cabinet for YAESU FDX401. G0JIB QTHR. 051-546 0111.

● BBC Technical Description of the London TV Station, papers in large black binder, and similar 405-line era literature. Also sought any 405-line TV recordings, amateur or broadcast. Sony open reel or VHS. BBC/ITV etc. caption and testcard slides, plus amateur TV items such as 405-line vidcon camera, C-mount lenses, diode-matrix caption/callsign generator, to buy or swap. Thanks - all letters answered. Andy Emmerson, G8PTH QTHR. (Northampton) 0604 844130.

● DRAKE L7 or L75 linear. G4PIP QTHR. 05642 3200.

● 30M or 40m QRP CW tvtr. GW3WSU QTHR. 04468 261.

● EC10 wanted. Eddystone EC10 working or not. Nick. 01-852 4065 leave message.

● TAVASU centre loaded mobile whip coils for 40m and higher frequencies. G4BSC QTHR. 89 Call Book.

● HISTORY of Wireless Telegraphy 1838-1899 by JJ Fahie, published 1901, reprinted Am Press 1971. Also want Textbook on Wireless Telegraphy Vols 1 and 2 by Major R Stanley published 1919 or 1923. Taylor, 89 Lion Road, Twickenham, Middx.

● MUTEK GFBA144E/ATC5 500 still urgently required. Good price paid. G4JBH QTHR. 0935 23873.

● DISABLED radio amateur urgently requires Trio R1000 gen. cov rcvr. Top cash paid for your R1000. Must be in mint cond, with manual and preferably orig packing. Would consider similar rcvr. Allan, G3GXR not QTHR. (Standish, Lancs) 0257 422766.

● TEN-TEC HF tvtr wanted. All models considered except Paragon. Details please to Williams, 40 Woodcroft Rd, Wylam, Northumberland, NE41 8DH. All letters answered. Sorry no phone.

● LABGEAR modulator PSU for LG300. Also circdiag of transmitter and power unit modulator. G3JLN QTHR. 0983 528697 day 0983 87220 eve.

● KW2000 circuit D9003 to buy, borrow or copy. Reasonable expenses. KW don't answer my letters. G0GVC QTHR.

● RADIO and Television Servicing. First 6 vols. E. Molloy and W. Poole. Must be 1st class cond. Your price paid. Mike, G8CTJ QTHR. 09904 3025 after 5pm.

● FRG7700, G6WKM QTHR. 0758 740171.

● PYE PF8. Also Burnped in GWO for use on 70cm. John. (B'ham) 021-360 9307.

● TRIO VB2300 10W 2m amp in good cond. Also wanted, process unit PB1534 as used in FT101E. G3SMW QTHR. 06284 2508.

Centre. Details G4MIS tel 0279 722622 evenings or G4KVR tel 0279 22365 daytime.

► 5th North Wakefield RC Rally - Outwood Grange School, Potovens Lane, Outwood, nr. Wakefield. Details Richard, G4GCX, tel 0532 622139.

1 OCTOBER

► RSGB National HF Convention, Belfry Hotel, Milton Common, Oxford. Further details from Don Field G3XTT on (0734) 724192.

► Blackwood Amateur Radio Rally - Oakdale Community College, Blackwood, Gwent. Details Brian, GW0JWF QTHR.
► Great Lumley ARES Rally - Great Lumley Community Centre, Chester-le-Street, Co. Durham. Details Barry, G1JDP tel 091-388 5936.

8 OCTOBER

► Armagh Rally - Drumsill House Hotel. Details J A Murphy, 18 Ogle Street, Armagh City, Co. Armagh, tel 0861 522153, after 5.30pm.

15 OCTOBER

► Bishop Auckland Radio Rally - Leisure Centre, Shildon, Bishop Auckland. Bring & buy, refreshments etc. Admission 11am (10.45 for disabled visitors). Details Ernie, G4TYF, tel. 0388 607500.

4 NOVEMBER

► 9th North Devon Radio Rally - Bradworthy Memorial Hall (near Holworthy). Admission 10.30am. Bring & buy stand etc. Tal in on 2 metres (S22). Details G8MXI (QTHR).

4/5 NOVEMBER

► North Wales Amateur Radio & Electronics Rally - Aberconwy Centre, Llandudno. Details Sigg, GW0DYH, tel 0492 517875 (evenings/weekends).

19 NOVEMBER

► West Manchester RC Winter Rally - Bolton Sports & Exhibition Centre. Details Dave, G1100 tel 0204 24104 evenings.
► Birmingham Mini-Mobile Rally - (Venue to be advised) Details Norman, G8BHE, tel 021-422 9787.
► Bridgend & DARC Radio Rally - Bridgend Recreation Centre, Angel Street, Bridgend, Mid-Glamorgan. Doors open 11am. Details GW4YKL, tel 0443 226198.

3 DECEMBER

► Verulam ARC Christmas Rally - St. Albans. Details Hilary G4JKS tel 0727 59318. Trade bookings, tel Watford 52959.

10 DECEMBER

► Leeds & DARS Christmas Rally - Pudsey Civic Centre, Dawson's Corner, Pudsey, nr Leeds. Details G Stubbs, tel 0532 585801.

4 MARCH 1990 (Provisional)

► The Great Northern Rally (Trafford Rally) - G-MEX Centre, Manchester. Details Graham, G11JK tel 061-748 9804.

11 MARCH 1990

► Welsh Mobile Rally - Barry Leisure Centre, off Horton Road, Barry, South Glamorgan. Details GW6RCK.

1 APRIL 1990

► White Rose Rally - Leeds University. Details G4DXA, PO Box 73, Leeds LS1 5AR.

8 APRIL 1990

► Cambridgeshire Repeater Group Rally and Junk Sale/Auction. Details G0HEM (QTHR).

OTHER EVENTS

28/29/30 JULY

► DATASPACE '89 (incorporating the 4th AMSAT-UK Colloquium and the 2nd RSGB Data Symposium) - University of Surrey, Guildford. Comprehensive lecture

programme covering data and satellite topics. Details Ron Broadbent, G3AAJ, tel 01-989 6741.

17-19 JULY

► International Maritime Satellite Organisation conference on "Mobile Satellite Communications". Special event station GB10SAT active 3-31 July. Details contact Lindsey Deakin of Blenheim Online Limited on 01-868 4466 ext. 243 or 257.

GB CALLS

The list below shows *all* special event stations licensed for operation during this month (as at press date). It is taken direct from the GB Calls file on the HQ computer. These call signs are valid for use from the date given but the period of operation may vary from 1 to 28 days. The call sign in parentheses is the source for further information.

1 AUGUST

► GB0CDQ - COASTAL DEFENCE Q (G0DHZ)
► GB0CDZ - COASTAL DEFENCE STATION Z (G3KXW)
► GB0RRA - RED ROSE AWARD (G0JBR)
► GB0RRR - RED ROSE RALLY (G0JWU)
► GB2GOB - GUIDE DOGS FOR THE BLIND (G4ODC)
► GB2HHC - HAIGH HALL CARNIVAL (G4IAV)
► GB2SCA - SOUTH CERNEY ANGLERS (G3NCL)
► GB2SOL - SPECIAL OLYMPICS LEICESTER (G4PDZ)
► GB4BIF - BILLINGHAM INTERNATIONAL FESTIVAL (G4GGP)
► GB4FRA - RED ROSE AWARD (G0FRL)
► GB4RRS - RED ROSE SILVER (G0IZR)
► GB5OK - 50TH ANNIVERSARY KIDDERMINSTER (G3HHM)
► GB6RRG - RED ROSE GOLD (G1AKN)
► GB6SS - SANDWELL SHOW (G0BZP)
► GB8RRR - RED ROSE RALLY (G1100)

2 AUGUST

► GB2MRI - MARCONI RATHLIN ISLAND (G4HCN)
► GB4MEN - CLUB CALLSIGN G4MEN (G4YIX)

3 AUGUST

► GB0WBI - WORLD BROADCASTING INFORMATION (G4JVG)
► GB4CSS - CARDIGAN SEA SCOUTS (GW4OUU)
► GB4RRM - RUTLAND RAILWAY MUSEUM (G3PJR)
► GB5RV - GSRV CLUB PRESIDENT (G0LOH)

4 AUGUST

► GB2RCC - RADIO CARAVAN CAMPING (G4EPN)
► GB6BFS - BURSTALL FLOWER SHOW (G6GAU)

5 AUGUST

► GB0KPF - KENT POLICE FORCE (G0JOH)
► GB2STH - ST. HELENS (G4WGB)
► GB2STL - STRATFORD TRIPLE LINK (G0CXJ)
► GB2XR - XR SQUARE EXPEDITION (G4FRE)
► GB4DTS - DUDLEY TOWN SHOW (G4DAR)

7 AUGUST

► GB0CDJ - COASTAL DEFENCE J (G0DHZ)

10 AUGUST

► GB0CDN - COASTAL DEFENCE NEEDLES (G3RJK)
► GB2YFT - YEOVIL FESTIVAL TRANSPORT (G3CQR)
► GB8XXV - 25TH ANNIVERSARY BRISTOL ARC (G3ZKI)

11 AUGUST

► GB2HTA - HIGHTOWN AMBULANCE (G3ABA)
► GB2JIC - J I CASE (G0ILM)
► GB2XS - X-RAY SIERRA SQUARE (GW4VYX)
► GB4BG - BEECHGROVE GARDEN (GM4GXD)
► GB4BIF - BILLINGHAM INT FOLK FESTIVAL (G4GGP)
► GB4HRR - HOSPITAL RADIO READING (G4CDJ)

12 AUGUST

► GB0BCA - BORDER COUNTIES AIRSHOW (G3HVX)
► GB0CDB - COASTAL DEFENCE B (G4LIK)
► GB0SUB - SUBMARINE ALLIANCE (G0FOD)
► GB2IRC - IPSWICH RADIO CLUB (G4IFF)
► GB2TS - TOLLERTON SHOW (G3WVO)
► GB2WW - 2ND WORLD WAR (G0EYM)

13 AUGUST

► GB0ACF - ARMY CADET FORCE (G0KKO)
► GB0VLB - VOLUNTARY LIFE BOAT (G0ASZ)
► GB2CDU - COASTAL DEFENCE (G0CWX)
► GB4MMM - MINASOTA MINING & MANUF. (G4ZUR)

14 AUGUST

► GB4WHT - WYTHENSHAW HEART TRANSPLANT (G4WKD)
► GB6ACF - ARMY CADET FORCE (G6TIG)

15 AUGUST

► GB0VJD - VICTORY JAPAN DAY (G3LP)
► GB2TVF - TOWERSEY VILLAGE FESTIVAL (G0FCV)

18 AUGUST

► GB0FCA - FLECKNEY CARNIVAL ASSOCIATION (G4EQL)
► GB8FC - RFC (G0BDG)

19 AUGUST

► GB0LCS - LAIRG CROFTERS SHOW (GW4VYX)
► GB0SBL - SNAPE BRITISH LEGION (G0CJX)
► GB1HSC - HAMPSHIRE SCOUT CAMP (G1ZOV)
► GB2DTG - DARWEN TOWN GALA (G2AKK)
► GB2EDS - EASTBOURNE DISTRICT SCOUTS (G3ZOB)

20 AUGUST

► GB0PSC - POOLE SEA CADETS (G0JJJ)
► GB1IRSG - ROYAL STAR & GARTER (G1DDR)
► GB2PPS - PEMBROKE POWER STATION (GW4VRO)
► GB2WF - WALTON FIRS (G4ZPV)
► GB5SM - STAMFORD MERCURY (G3HEE)

21 AUGUST

► GB0SGS - SHAFTESBURY GILLINGHAM SHOW (G0GWC)
► GB2CPC - CASTELL PENRHYN CASTLE (GW0ABL)

22 AUGUST

► GB2PD - PEMBROKE DOCK (GW4VRO)

24 AUGUST

► GB2RFS - ROCKINGHAM FOREST SCOUTS (G4MRA)

25 AUGUST

► GB2RCC - RADIO CARAVAN CAMPING (G4EPN)
► GB2SSD - SCOTLAND'S SMALLEST DISTILLERY (GM3MTH)
► GB4TCF - TOWN & COUNTRY FESTIVAL (G4VCX)

26 AUGUST

► GB0HAK - HELP A KID (G0LJQ)
► GB0VWH - VALE WHITE HORSE (G6LNU)
► GB2CCM - CRABBLE CORN MILL (G4SAU)
► GB2RFC - ROYAL FLYING CORPS (GM4YWS)
► GB2RR - 'RHONDDA REMEMBERS' FESTIVAL (GW4BUZ)
► GB4ATG - AMATEUR TELEDATA GROUP (G4EAN)
► GB800 - 800 YEARS NORTHAMPTON CHARTER (G4SVX)

27 AUGUST

► GB2NJA - CLUBS SUFFIXS NJA (G3LHJ)
► GB5TP - TRENT PARK (G0JUZ)

28 AUGUST

► GB0CDD - COASTAL DEFENCE D (G0HCZ)
► GB0CDS - COASTAL DEFENCE SOUTHWICK (G0JEZ)
► GB6CDV - COASTAL DEFENCE VENTNOR (G0HCZ)

30 AUGUST

► GB1RC - RIFON CADETS (G1RVU)
► GB2WOS - WORKING OF STEAM (G4ZLX)

1 SEPTEMBER

► GB0CDZ - COASTAL DEFENCE STATION Z (G3KXW)
► GB0GPF - GLOUCESTERSHIRE POLICE FORCE (G4KWW)
► GB2GAF - GLOUCESTER AIR FORCE (G3MA)
► GB4BAM - BRENZETT AVIATION MUSEUM (G0LAD)
► GB4RFC - ROYAL FLYING CORPS (G3FOH)
► GB4RRG - RED ROSE GOLD (G0FRL)
► GB6RA - RED ROSE AWARD (G1TAR)

2 SEPTEMBER

► GB0WFS - WELLOW FLOWER SHOW (G0LBI)
► GB2MC - MUCKLEBURGH COLLECTION (G4DCJ)
► GB5TD - TINWALD DOWNS (GM4NNC)

3 SEPTEMBER

► GB0WPF - WILTSHIRE POLICE FORCE (G4SHV)
► GB2TE - TRANSPORT EXTRAVAGANZA (G0FCV)

7 SEPTEMBER

► GB0XXV - 25TH ANNIVERSARY BRISTOL ARC (G3ZKI)

8 SEPTEMBER

► GB0GPF - GLOUCESTERSHIRE POLICE FORCE (G4KWW)
► GB2SSG - SILEBY SCOUTS & GUIDES (G4UBD)
► GB4HH - HINWICK HALL (G0EAE)
► GB4LSG - LONG SUTTON GALA (G4KHF)
► GB8FC - RFC (G0BDG)

9 SEPTEMBER

► GB0RAF - ROYAL AIR FORCE (G4NVD)
► GB2INB - INCE B (G4XQA)
► GB2WMF - WINSOMBE MICHAELMAS FAIR (G0KBT)
► GB4RAF - ROYAL AIR FORCE (G4WZU)
► GB5CS - CARDIFF SHOW (GW3TOI)
► GB8SL - STOURBRIDGE LION (G4XOM)

10 SEPTEMBER

► GB2CDU - COASTAL DEFENCE (G0CWX)

11 SEPTEMBER

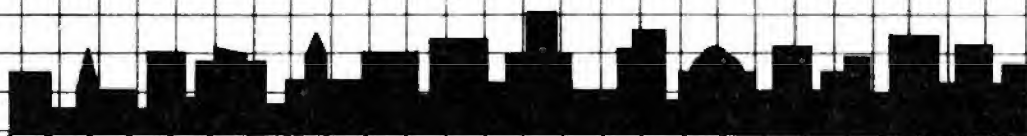
► GB0SUB - SUBMARINE ALLIANCE (G0FOD)
► GB2MAR - MARCONI AMATEUR RADIO (G3RDR)

L.A. Moxon, G6XN



hf antennas

for all locations



HF ANTENNAS FOR ALL LOCATIONS by Les Moxon, G6XN, is renowned worldwide as probably the most in depth look at practical amateur radio hf antennas available. Sometimes controversial, but always helpful and encouraging to the experimenter, the author guides the reader through the theory of hf antennas with the minimum of headaches. The book is not just theory however. Many practical designs are given, a large proportion of which are completely unique to this book. Whether you throw a piece of wire out of an upstairs window, or have four elements on 7MHz you cannot fail to be fascinated by this book.

HF Antennas for All Locations costs £6.15 to RSGB members by post.

the last ...

WAB QSL CARDS

I recently had the pleasure of attending the Friedrichshafen Ham Radio event in West Germany on behalf of the WABA. We received a number of complaints from people about the poor QSLing rate of G stations. In addition we had one member of our organisation visit us with over 100 QSL cards on which he had queries. These ranged from several which contained no QTH information at all to those with downright misleading information on towns and counties. It was a great surprise to find many cards from relatively newly licensed stations contained non-existent counties etc on their cards. With the growth of our organisation overseas can I request that stations (even if not interested in WAB) put on at least their correct administrative county and full address. This will at least enable our members to deduce WAB areas from road atlases.

Dr RJ Nash, G4GEE

GB STATION ADVICE

If you are genuinely running a GB station as an exhibition of the hobby for members of the public or specific groups such as Scouts, Youth Clubs, etc, you will obviously convert only a very small minority into actually becoming radio amateurs themselves. However I am of the opinion that it is just as important that you raise interest in and public respect for, our hobby. If visitors leave your stand feeling they have met a friendly and dedicated group of hobbyists then you will have been successful.

When you speak from your own station to the operator of the GB station where members of the public are present you should not launch into a highly technical description of your station using the normal amateur jargon. Stick to information anyone can understand and possibly concentrate on details of your location for there is usually someone in an audience who has visited your area and this raises a mutual interest. Remember when in contact with a GB station you are part of the exhibition element yourself.

Where a GB station operates for a number of days in an area highly

populated with amateurs it is possible for licensed (and often uninvited) visitors to overcrowd your stand to such an extent that the 'customers' cannot get a look in. This defeats the object of the exercise and the offenders should be lured away to an area where they can chat to their hearis content (a bar?)! Don't let visitino amateurs ruin your efforts.

M Mitchell, G3BHK

2M QRM

Are any other stations in the Birmingham area suffering from interference on 2 metres, the interference seems to be a cross between the HF band 'Woodpecker' and 'Data' type transmissions, sometimes only on a few frequencies in the 2M band and right across the band at others? The signals vary in strength up to at times S9 and from my home location there appear to be three different sources, from the NW and NE which appear to be the most frequent and strongest, with the third from the E which is very infrequent and never heard stronger than S5.

Whenever there is a 'Pile up' on the VHF bands, mainly 6M and 2M, many stations continue to call the DX station when that station is trying to pass information to a specific station, but the outstanding piece of bad manners which to date I have only heard from UK stations, is when the DX station asked for calls from only a particular prefix, ie G0's, many stations with other prefixes continue to call, or even when only non-UK or no G's, they still ignore the request, this often results in causing unnecessary QRM to the DX station, but also the DX station refuses to work any further UK stations, occasionally going QRT as a direct result of these bad manners. A couple of these stations are the very ones who in either letters or specific sections of various magazines request the readers to comply with these requests from DX stations, but chose to ignore the advice when they are calling.

In my role as G7 QSL Sub Manager, I often receive QSL cards for G7 call signs not yet issued, these are I suspect either 'Pirates' or mistaken call signs and are invariably for contacts on the HF bands, also I occasionally get cards again for HF

band contacts, but for unissued G7 call signs, whether these are for 'Pirates' or again mistaken call sign I don't know. But of these latter, I wonder if any are due to G7's operating Special Event Stations, and asking for the QSL card for their own call sign as well as to the Special Event Station, or are they operating outside their licence? In either case I wonder what they want the QSL cards for, as they would not be acceptable for any Awards, or is it just for their own ego?

DJ Hudson, G6OV0

MUM ISN'T DUMB

You will no doubt notice, that I have left my address off, as I do not want it printed, and in case this letter went astray, no-one is any the wiser of my address other than the RSGB.

I feel that it would help considerably if Amateurs did not discuss over the radio, when they intend to be away from home, ie on holiday or out for the day, as it is an open invitation to the thief - there are many other ways of telling friends, other than on amateur radio.

It is a good practice to tell ones neighbour and/or local police. Alarms are cheap enough these days and do not cost an arm and a leg to install. I hear it said many times and feel how foolish some can be, and I'm not the only listener. It is far safer to discuss ones holidays etc after, not before. In this way we may see no stolen equipment in RadCom. (name & address withheld at author's request)

QSL QUANDARY

With regard to G3DRN's letter in RadCom June 1989, so many of us must be grateful throughout the years to him for his noble and indefatigable efforts on our behalf in looking after our QSL cards, that it is only reasonable to show as much consideration as possible to lighten his load.

The facts are these: Many people send cards for every QSO irrespective of whether or not a QSO has previously been made or repeated causing a wanton deluge of QSLs to be processed and likewise many people ignore requests for QSL cards without stating they are not wanted. Many people don't bother to send SASE's causing time consuming processed cards to be disposed of. Many people like myself don't particularly want QSL cards but I personally honour those received and send mine in return. There is not a 100%

demand for cards and I suggest that at the end of a QSO, if a card is not wanted, it should be cleared stated 'QSL not required' or better still, for the sake of brevity and for the benefit of foreigners with limited English - an international expression eg 'QLNR' could be adopted.

Finally, many thanks again G3DRN and the teams of sub managers for your valiant efforts on behalf of fellow amateurs who do value QSL cards.

H Wilson, GM4SJC

GVOISO QSL

In reply to the GVOISO QSL request in the July RadCom, as QSL Manager for the RNARS I agree with the comment "Not what we expect from the Senior Service" and will try to obtain cards for any of the special calls used by the RNARS in 1985. I will need the usual log details (G4PRI please note).

GB4HMS was used by six members in that year, five replied to all requests. Any requests for cards during the period 22-4-85 to 19-5-85 will not be answered as this operator has refused to QSL.

1985 was a busy year for the society, also for the RSARS and RAFARS. There were 18 special RNARS calls and 41 operators, with thousands of contacts in the UK and overseas, so please forgive us if we missed a few.

D Costello, G4UKJ

MORSE TEST CONGRATULATIONS

I am writing to congratulate the RSGB on the way the morse tests are conducted. The examiners are as helpful as they can possibly be and make every effort to ease the tension. My second attempt was successful, and the effort has been worthwhile. The standard set is a reasonable one and in my opinion should be maintained in its present form. My best wishes to the Gloucester and Swindon centres and to the RSGB. Keep up the good work!

SC Thain, G0LJE

ENGLISH AS SHE IS SPELLT!

Long live the 'Last Word'! If Franglais is an English-French bastard language eschewed by the French, is Jameranglais a Japanese/American/English cross of equally doubtful origin to be avoided by the English?

A recent advert in RadCom invited me to take a look at 'this easy to use..TWO METER TRANSCEIVER' (bold typeface half inch high). So I did take a close look - there wasn't one 'meter' in sight, let alone two. What I did notice was that the device in question was a 144MHz - in other words. TWO METRE. Transceiver!

And eye mite add, this aint the only thing wot dont read right. How often does on hear "the biggest of two" the "largest half" "almost exactly equal to" of footballers who "fall to the floor" or viruses and bacteria bing one and the same thing... I could go on, ad nauseam!

Do we really have to have English bastardised and abused in this way, even if it is by others' default, imprecision or ignorance? My sympathies are with G4OPJ, a pedant I may be, but that might be one stage advanced from a peasant!

MW Dixon, G3PFR

REBYNE

by G6MEN



... word



ICOM

Count on us!

IC-725 Budget HF



- General Coverage Receiver
- 105dB Dynamic Range
- 100W Output
- DDS System
- 26 Memories
- Scanning
- CI-V Computer Control
- Semi Break-in

The new ICOM IC-725 budget H.F. has been produced due to the demand for a simple, high specification transceiver. Despite the limited features, compared to more expensive equipment this set retains a superior level of technical performance necessary to operate on the H.F. bands today.

Additional features include Noise Blanking, Pre-amp, Attenuator, AGC and RIT. The DDS System (Direct Digital Synthesizer) ensures fast Tx/Rx switching times, ideal for Data Communications. An A.T.U. controller is built

into the IC-725 for use with the AH-3 H.F. Automatic Antenna Tuner for mobile or base station operation.

Accessory options available are the PS-55 20A P.S.U., AH-3 Auto Antenna Tuner, UI-7 AM Tx. FM Tx/Rx Unit, FL-100 500Hz CW Filter, FL-101 250Hz CW Narrow Filter and SP-7 External Loudspeaker.

For more information on the IC-725 budget H.F. and other ICOM amateur equipment contact your nearest authorised ICOM dealer or phone us direct.

Icom (UK) Ltd.

Dept RW, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

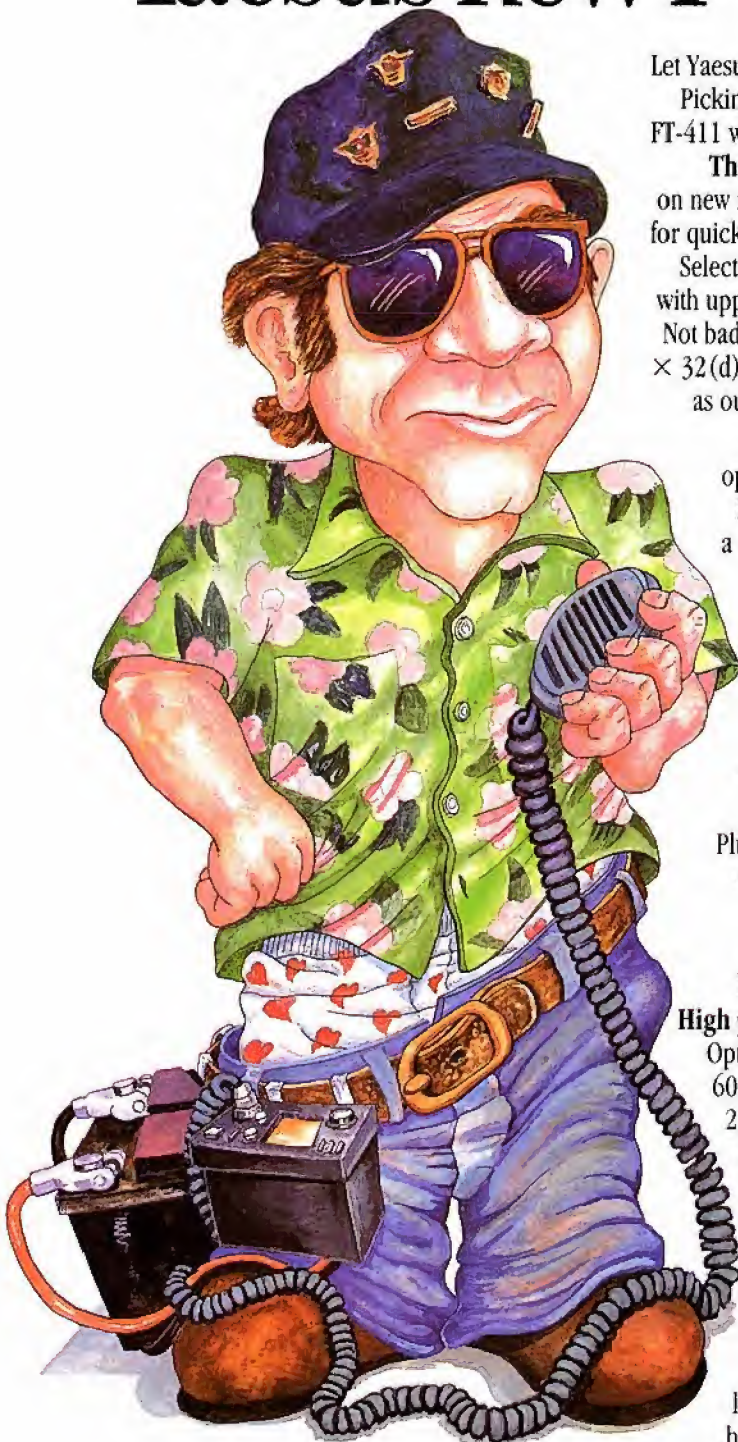
Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

Datapost: Despatch on same day whenever possible.

Access & Barclaycard: Telephone orders taken by our mail order dept, instant credit & interest-free H.P.



You'll be hard-pressed to beat the performance of Yaesu's new FT-411 handheld.



Let Yaesu's "next generation" handheld lighten your load!

Picking up where our popular FT-209R Series left off, the 2-meter FT-411 will amaze with its astounding array of features!

The brains of a base station. "Sophisticated operation" takes on new meaning in the FT-411. You get 49 memories, plus dual VFOs for quick band-hopping. Keyboard frequency entry. Automatic repeater shift. Selectable channel steps: 5/10/12.5/20/25 KHz. Programmable band scan with upper/lower limits. Selectable memory scan.

Not bad for a handheld measuring just 55(w) × 32(d) × 139(h) mm (the same size as our FT-23R Series handies).

Friendly operation. For operating convenience, the FT-411's keypad features a "do-re-mi" audible command verification. Both the display and keypad can be backlit (brightly!) for night operation at the push of a button. A rotary channel selector allows fast manual tuning. Or key in the frequency directly. Operate VOX (with YH-2 headset option). Plus you get a battery saver to conserve power while monitoring. And a (defeatable) automatic power-off feature that shuts down your radio if you forget to turn it off!

High power capability.

Optional nicad packs available are FNB10, 2.5-watt, 600-mAh. FNB-12 5-watt, 500mAh pack or tiny FNB-9 2.5-watt, 200mAh pack. Or you can get 6 watts output by applying 13.8-volts DC from an external power supply.

Swap options with Yaesu's FT-23R Series. Our rugged best-seller's chargers, batteries, and microphones are fully compatible with the FT-411. The FT-23R is the perfect companion for the FT-411, and at a great price!

Try out an FT-411 today. At your local authorised Yaesu dealer. And experience the legendary Yaesu handie performance!



YAESU